

**A CLINICAL STUDY OF ANALYSIS OF CYSTIC
SWELLINGS OF THE SCROTUM
DISSERTATION**

*SUBMITTED TO THE TAMILNADU DR.M.G.R MEDICAL
UNIVERSITY OF HEALTH SCIENCES, CHENNAI TAMILNADU*

IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE AWARD OF

M.S. (GENERAL SURGERY)

DEGREE

**DEPARTMENT OF GENERAL SURGERY
TIRUNELVELI MEDICAL COLLEGE TAMILNADU**

APRIL 2016

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Dear Dr. M. Pachaipondy , The Tirunelveli Medical College Institutional Ethics Committee (TIREC) reviewed and discussed your application during the IEC meeting held on 28.12.13.

THE FOLLOWING DOCUMENTS WERE REVIEWED AND APPROVED

1. TIREC Application Form
2. Study Protocol
3. Department Research Committee Approval
4. Patient Information Document and Consent Form in English and Vernacular Language
5. Investigator's Brochure
6. Proposed Methods for Patient Accrual Proposed
7. Curriculum Vitae of the Principal Investigator
8. Insurance /Compensation Policy
9. Investigator's Agreement with Sponsor
10. Investigator's Undertaking
11. DCGI/DGFT approval
12. Clinical Trial Agreement (CTA)
13. Memorandum of Understanding (MOU)/Material Transfer Agreement (MTA)
14. Clinical Trials Registry-India (CTRI) Registration

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THE PROTOCOL IS APPROVED IN ITS PRESENTED FORM ON THE FOLLOWING CONDITIONS

1. The approval is valid for a period of 2 year/s or duration of project whichever is later
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8. In the events of any protocol amendments, TIREC must be informed and the amendments should be highlighted in clear terms as follows:
 - a. The exact alteration/amendment should be specified and indicated where the amendment occurred in the original project. (Page no. Clause no. etc.)
 - b. The PI must comment how proposed amendment will affect the ongoing trial. Alteration in the budgetary status, staff requirement should be clearly indicated and the revised budget form should be submitted.
 - c. If the amendments require a change in the consent form, the copy of revised Consent Form should be submitted to Ethics Committee for approval. If the amendment demands a re-look at the toxicity or side effects to patients, the same should be documented.
 - d. If there are any amendments in the trial design, these must be incorporated in the protocol, and other study documents. These revised documents should be submitted for approval of the IEC, only then can they be implemented.
 - e. Approval for amendment changes must be obtained prior to implementation of changes.
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ABSTRACT

Background and Objectives

1. To study various types of clinical presentation of cystic swelling of scrotum.
2. To find out the commonest cause of Cystic swelling of scrotum.
3. Different treatment modalities adopted.
4. Outcome of the Treatment.

Patients and Methods

Between April 2014 and April 2015 about 60 patients with cystic swelling of scrotum admitted in surgical unit of Tirunelveli Medical College and Govt. Hospital, Tirunelveli were taken up for study, and various surgical techniques like eversion, plication, subtotal/partial excision and eversion of sac was adopted.

Results

Primary vaginal hydrocele (70%) is the commonest cause of cystic swelling of scrotum, followed by secondary hydrocele (10%) and epididymal cyst (3%), incidence was more in age group of 21-30years (31%), most of them were coolie by occupation (38%), side wise, Right side the incidence was higher. Haematoma and infection was seen in cases where eversion and partial/subtotal excision of sac was done; In Lords procedure none of them developed haematoma or infection, flattening of testis was seen in 5 cases of primary vaginal hydrocele.

Conclusion

Lord's Plication for hydrocele is simple, effective, safe and economical; could be done as a day care surgery. In eversion of sac and partial/subtotal excision and eversion of sac heamatoma formation and infection is common; but still it is the choice of operation for large hydrocele and in thickened sac.

Keywords: (Lords Plication, eversion, excision of sac, congenital hydrocele, epididymal cyst, Heamatoma, Primary vaginal hydrocele)

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CYSTIC SWELLINGS OF SCROTUM

INTRODUCTION

Cystic swellings of scrotum are one of the commonest clinical entities which surgeon comes across in daily practice. Since scrotum is placed outside the lower abdomen they are easily accessible for clinical examination and self examination.

There are various reasons for scrotum to become swollen ranging from hydrocele, the commonest cause; to some rare causes like gumma of testis or malignant tumours of the epididymis. Some of the other cystic swellings are spermatocele, Haematocele, epididymal cyst, pyocele, chylocele, parasitic cysts.

Cystic swellings of scrotum are usually painless and can attain a very big size without causing much discomfort to patient. The mortality from this condition is negligible. The scrotum is liable to traumatic injury due to their hanging down position and mobility leading on to haematocele.

Primary hydrocele is an abnormal collection of serous fluids in some part of the processus Vaginalis, usually the tunica.

Epididymal cysts represents cystic degeneration of the epididymis and are filled with crystal clear fluid. Spermatocele is a retention cyst arising from either the vasa efferentia of the testis or from the epididymis. The conventional methods for treatment for primary hydroceles epididymal cyst, and spermatoceles, includes repeated aspiration, aspiration and injection of sclerosant or surgery. Sclerosant may cause pain, repeated aspiration carries the risk of infection and haematoma formation. The gold standard continues to be surgical extirpation of the cystic lesion.

In cystic swelling of scrotum, surgical treatment of Idiopathic hydrocele includes four basic techniques – Lord's plication, Jaboulay's eversion of the sac,

Winkelmann's partial excision and eversion of the sac and radical excision of the sac.

Cystic swelling's of scrotum are a common entity in day to day clinics. Because of varied etiology, their mode of presentation and management is unique for each. There is a necessity to study the ideal treatment modality for a given type of cystic swelling. Hence this topic is taken up for dissertation.

Secondary hydrocele may be the clinical presentation of an underlying tumor which needs early diagnosis.

AIMS AND OBJECTIVES OF STUDY

- To study the different clinical pattern of presentation of patients with cystic swellings of scrotum and their incidence.
- To study the age wise and side wise distribution of the cystic swelling of scrotum.
- These scrotal swellings occur in all age groups. Hence there is a necessity to study the age wise distribution and the cause and predisposing factors related to these age groups.
- To study the different treatment modalities for a given type of cystic swelling of scrotum and their advantages and disadvantages.
- To study the postoperative complications of surgical procedures.
- Early detection of Testicular malignancy which patient may not aware.
- To findout the commonest cause of cystic swelling of scrotum.

REVIEW OF LITERATURE

HISTORICAL ASPECT

Scrotal swellings were known to occur since ancient times and have been reported as far back as 5th century B.C.

- Sushruta, the father of Indian surgery had written the details regarding hydrocele in his book “Sushruta Samhitha” about 2,500 years ago.
- Dupuytren described hydrocele enbissac in 1934 and the name abdomino scrotal hydrocele was proposed by Bickle in 1919.
- In 1907, Andrews described the bottle operation for treatment of Hydrocele.
- In 1955, salomon described the extrusion operation for hydrocele.
- In 1970, Lord PH described a blood less operation for spermatocele and epididymal cyst.
- In 1975, Moloney reported good results with sclerotherapy. It is performed as an outpatient procedure and thus, it is cost effective.
- In 1995 s study done by Gunaydin G et al, Indicated that fluids within spermatoceles and epididymal cysts do not become infected under normal circumstances.
- Captain Edward gibbon (1737 – 1794), the English historian, best known for his “History of the Decline and fall of the Roman empire” was greatly embarrassed by Hydrocele. He died of secondaries.
- Mathew Jaboulay (1860-1913) professor of surgery at Lyons, France described the operation and partial excision and eversion of sac for hydrocele.
- Peter Lord (1964) described the plication operation for hydrocele.

EMBRYOLOGICAL ASPECT

- Development of scrotum and its contents.
- Development of testis, epididymis and vas deferens.

Stages of development of testis :

There are four stages in the development of testis.

1. Formation of gonadal ridge / genital ridge
2. Migration of primordial germ cells into gonadal ridge.
3. Stage of indifferent gonad
4. Stage of differentiation of testis

Testis :-

Each testis develops from the coelomic epithelium that covers the medial side of the mesonephros. This is indicated by the appearance of an area of thickened germinal epithelium on the medial side of mesonephric ridge in the 5th week. This thickening is known as genital or gonadal ridge. Up to the 7th week the gonad has no differentiating features. Then the rapidly proliferating germinal epithelium forms a number of solid gonadal or sex cords, separated by mesenchyme.

These cords remain at the periphery of the primordium to form a cortex and in the centre proliferation of the mesenchyme of mesonephros constitutes medulla.

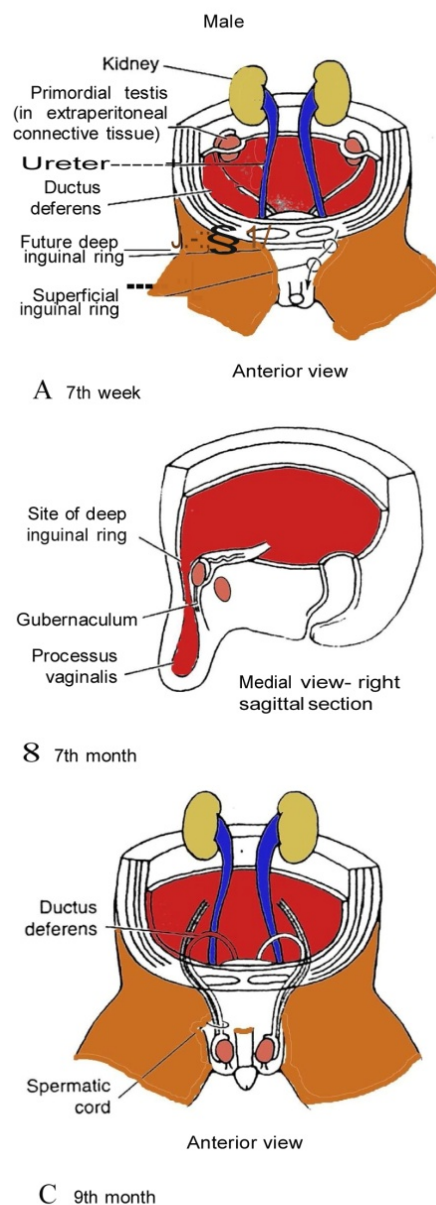
- ✓ The cellular cords encroaches on the medulla, where they unite with the network derived from the mesenchyme which ultimately becomes testicular rete.
- ✓ With the incorporation of primordial germ cells into the cords and canalisation, seminiferous tubules are formed. The cords that are not canalised from the interstitial cells of testies. Some of which are also derived from the surface of gonad form the
- ✓ supporting cells of sertoli, these tubules remain solid until 5th to 6th month.
- ✓ The mesenchymal cells surrounding the developing testis, form a dense fibrous layer called the tunica albuginea. The leydig cells are seen by the 3rd month. Between 8th and
- ✓ 11th week the testis shorten broaden.
- ✓ The rete testis becomes connected to the mesonephric duct by the 5-12 most cranial persisting mesonephric tubules.
- ✓ These become highly coiled to form the lobules of the head of the epididymis. The distal part of
- ✓ The mesonephric duct becomes the vas deferens.

Descent of the testis :-

The testis develops in relation to the lumbar region of the posterior abdominal wall. At first the testis lie parallel to the long axis of the body but by the 50mm stage becomes transverse.

During foetal life the testis gradually descend into the scrotum. By third month they reach the iliac fossa and lie at the deep inguinal ring by the 7th month. They pass through the inguinal canal during the 7th month and into the bottom of the scrotum by the end of the 8th month.

Male



Descent of the testis

Mechanism and factors assisting descent

Scorer (1962) has described the mechanism of descent very well. According to him descent does not start before 23mm stage of embryo. Hormonal and anatomical factors are said to play a role in descent which is still uncertain.

The factors are :-

1. Differential growth of the body wall.
2. Formation of inguinal bursa :- By about 6th month of Intrauterine life various layers of the abdominal wall show an out pouching towards the scrotum on each side, this pouch increases in size and depth to reach the bottom of scrotum. The descending testis enter this pouch to reach the scrotum. The cavity of inguinal bursa becomes the inguinal canal.
3. The gubernaculum :- is a band of mesenchyme extending from the lower pole to testis to the scrotum.

Some investigators put-forth the active contraction and shortening of gubernaculum helps in descent (but gubernaculum does not contain any muscle) b y dilating Inguinal bursa. Others say that the soft consistency of gubernaculum offers a route of low resistance for testicular descent, but the mechanism of final rapid intrascrotal descent still remains a mystery and Shapiro (1930) has proposed a role for hormones.

4. Processes Vaginalis :- is a diverticulum of peritoneal cavity which grows into the gubernacular mesenchyme and scrotum accompanied by its peritoneal covering. The distal end of the processes vaginalis into which testis projects forms the tunica vaginalis testis and the proximal portion becomes obliterated.

Failure of obliteration of the processus vaginallis give rise to congenital hydrocele and hernia.

5. The role of intra-abdominal pressure is not fully understood. In premature births the testes were undescended in 50% or more infants weighing less than 4lb and descended in 50% or more large infants (Scorer 1956).
6. Patent process vaginalis :- Leads to following conditions.
 - a) Along entire length => Congenital hernia or congenital hydrocele
 - b) Only in the middle part => Encysted hydrocele of the cord.

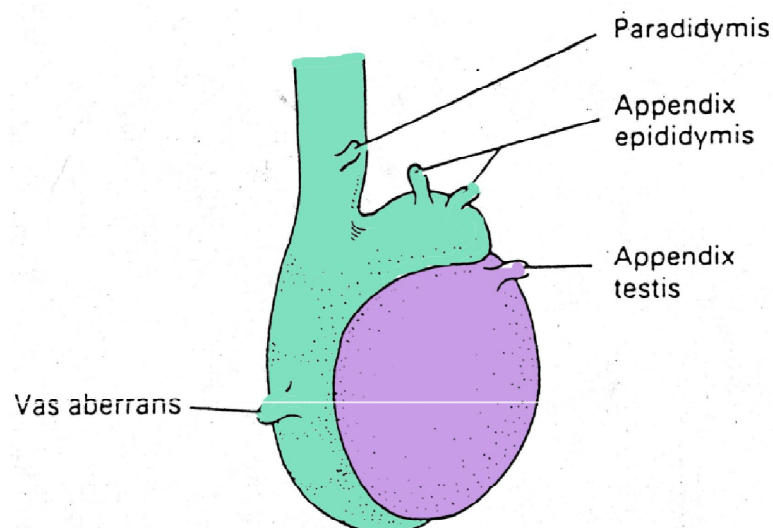
- c) Only at the lower pole => Vaginal Hydrocele
- d) Up to the internal ring => infantile hydrocele.

Scrotum :-

Develops from the fusion of paired swellings on the anterior abdominal wall and therefore presents a median raphe which is continuous with ventral raphe of the penis. At this raphe the skin of the scrotum is continuous from one side to the other and so is the superficial fascia and dartos. The dartos from its deep surface sends a septum in to separate the scrotal sacs, into each of these sacs descends an out pouching of the abdominal wall, the Inguinal bursa. Each inguinal bursa is intimately related to the testis and often after the descent of the testis the two descend further into the scrotum.

VESTIGIAL STRUCTURES IN THE REGION OF TESTIS

1. Appendix of testis (Hydatid of Morgagni)
2. This is the persistent part of the cranial end of the paramesonephric duct, attached to the testies.
3. Appendix of Epididymis :- This represents the cranial end of the mesonephric duct, attached to the head of the epididymis.
4. Superior aberrant ductules :- They lie cranial to the vas and are connected to the testis.
5. Inferior aberrant ductules :- they lie caudal to the vas and are connected to the epididymis.
6. Paradidymis (organ of Giraldes) :- Consists of tubules that lie between the testis and epididymis, not connected to either of them.



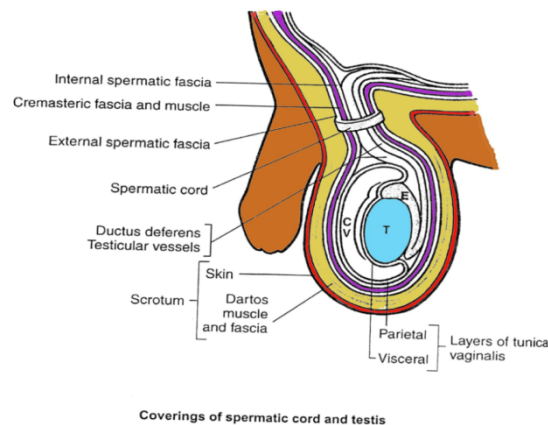
The appendages of the testis.

ANATOMY AND PHYSIOLOGY OF SCROTUM AND ITS CONTENTS :

The scrotum is a cutaneous fibro muscular sac containing the right and left testis. The epididymis and the lower parts of the spermatic cords. It suspends below the pubic symphysis, between the anteromedial aspects of the thighs. It is divided into right and the left halves by a cutaneous raphe continued ventrally to the inferior penile surface and dorsally along the midline of the perineum to the anus. Its left side is usually lower, due to the greater length of the left spermatic cord. The raphe indicates the bilateral origin of the scrotum from the genital swellings. The external appearance varies thus when warm, the elderly and indeliberated persons the scrotum is smooth elongated and flaccid; but when cold and in the young and robust it is short, corrugated and closely applied to the testis.

The scrotal layers consists of

1. Skin.
2. Dartos muscle
3. The external spermatic fascia
4. The cremasteric fascia
5. The internal spermatic fascia
6. Tunica vaginalis
7. Testicular Albuginea
8. Tunica Vasculosa



The Scrotal Skin

The scrotal skin is thin, semitransparent, distensible and darker than surrounding skin and often rugose, bears thinly scattered crisp hairs, their roots visible through the skin. It has sebaceous glands, whose secretion has a characteristic odour and also numerous sweat glands, pigmented cells and nerve endings responding to the mechanical stimulation of the hairs and skin and to variations of temperature. It lacks the subcutaneous adipose tissue.

The Dartos Muscle

Just beneath the skin is the dartos muscle, a smooth muscle (involuntary action) continuous beyond the scrotum with superficial inguinal and perianal fascia, extending into a scrotal septum, connecting.

The raphe to the inferior surface of the penile radix and dividing the scrotum into two cavities. The septum contains all the layers of scrotal wall except skin. The Dartos muscle is closely united to the skin, but is connected to sub adjacent parts by the delicate loose connective tissue, giving it marked independence. It is useful for Thermoregulatory mechanism which is essential for Spermatogenesis.

The External Spermatic Fascia

It is a thin fibrous stratum continuous above with the aponeurosis of the obliques externus abdominis, descends from the crura to the superficial ring.

Cremastric Fascia

A few fibres from the internal oblique muscle form the cremasteric muscle.

The loop like fibres of cremasteric fascia form a partial investment for the and spermatic cord. The fibres are fused to the partial layer of tunica vaginalis along with the internal spermatic fascia, a continuation of the transversalis fascia. Contraction of this musculo- fibrous layer draws the testis into the sub-inguinal pouch and protects it from injury.

The Internal Spermatic Fascia

It is a thin, loose layer around the spermatic cord, derived from the transversalis fascia.

Cremasteric reflex

On tickling or scratching the medial aspect of thigh. The cremaster contracts. This is mediated by the S1 root.

Tunica vaginalis derived from the vaginal process of peritoneum but cut-off from it by obliteration of the processes vaginalis. It provides a covering for most of the testis and epididymis. It has a visceral and parietal layer with a potential space in between. The visceral layer is firmly adherent to the tunica albuginea of the testis and dips between the upper part of testis and epididymis forming a pouch called the sinus of epididymis. The visceral layer extends upwards for a short distance along with the spermatic cord. The parietal layer is separated from the scrotum by a fine layer of extra vaginal cellular tissue.

Blood Supply :-

The anterior scrotum derives its blood supply from the external pudendal artery, which is branch of the femoral artery. Posteriorly scrotum is supplied by branches of internal pudendal artery with additional supply from testicular and cremasteric arteries traversing the cord.

The venous drainage is into femoral vein.

Nerve supply :-

The anterior scrotal wall (1/3) is supplied by ilio-inguinal and genito femoral nerves and posterior scrotal wall (2/3) by posterior scrotal branches of perineal division of pudendal nerve. Scrotal skin is also innervated by posterior femoral cutaneous nerve branches.

Lymphatic drainage :-

The scrotal lymphatics do not accompany pudendal vessels and have no connection with testicular lymphatics. The lymphatics from both halves of scrotum anastomosed freely and drain to the medial group of superior inguinal nodes.

Testis

The testis are the male reproductive organs, they are bilateral, ovoid, glandular structures measuring 4 to 5cms in length and 2-3cms in thickness. Testes has two surfaces lateral and medial surfaces, 2 borders, anterior and posterior and 2 ends upper and lower. Each testes weighs 10-15gms.

They lie within the scrotal sac, suspended by the spermatic cords. They are attached to the base of the scrotum by scrotal ligaments. The normal testis is smooth, firm and elastic, squeezing it gently causes a peculiar sickening pain in the lower abdomen. (The testicular sensation) which is lost early in cases of testicular tumor.

Coverings of testis :-

1. Visceral layer of tunica vaginalis (derived from peritoneum)
2. Tunica albuginea
3. Tunica vasculosa (contains plexus of blood vessels in loose areolar tissues)

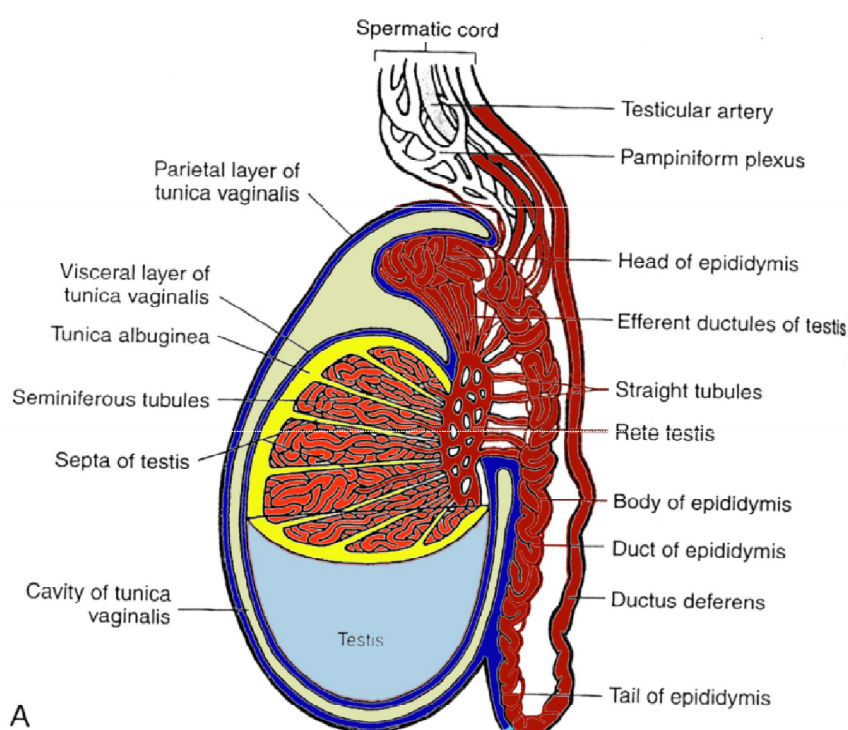
The visceral layer of tunica vaginalis covers the testes completely except for a small part posteriorly near hilum where it is attached to the epididymis and spermatic cord and where the testicular vessels enter and leave the testes and vas deferens passes upwards.

The tunica albuginea is a pearly white fibrous layer (capsule) surrounding the testes and epididymis. From the deeper aspect of this layer numerous fibrous septa pass radially backwards dividing the testes into various compartments. These compartments converge towards upper pole at the mediastinum region, which contains the rete testes.

The septae divide the testes into 400 or more lobules each of which contains 2 or more highly convoluted seminiferous tubules, which may be up to 2 feet when stretched, from the epithelial lining of these tubules spermatozoa are produced.

The seminiferous tubules converge towards the rete testes where they are connected by straight tubular recti, which join to open into the Head of Epididymis, straight tubular lining elements, mainly consist of sertoli cells, which play a minor part in spermatogenesis. The specialized cells of leydig elaborate androgens mainly testosterone.

Spermatogenesis is temperature dependent occurring at lower temperature; where as hormone secretion is not. Hence, in cases of cryptorchism/ undescended testes, the hormonal production is unimpaired where as spermatogenesis is decreased resulting in oligospermia and azoospermia.



A sagittal section of testis and epididymis

Histology :-

The surface is a layer of flat mesothelial cells, resembling those of the surrounding peritoneum, internally the testicular architecture is dominated by the lobules, their number in human testis being 200 to 300. They differ in size, those centrally placed being larger and longer. Each contains one to three or more minute convoluted seminiferous tubules, their loose supporting connective tissue contains

grouped interstitial cells of yellow-pigmented granules. The tubules in each testis are about 400-600 and length of each is 70-80cms. Their diameter varies from 0.12 - 0.3mm. They are pale in early life, but in the older age group they contain much fat and are deep yellow. Each has a basement membrane of laminated connective tissue containing elastic fibers, with flat cells between the layers, and covered externally by flat epitheloid cells. As it ages the basement membrane the seminiferous epithelium consists of spermatogenic and supportive cells. The former when active include an array of types from spermatogonia through their derived forms, spermatocytes and spermatids, to mature spermatozoa. Among the spermatids may be residual bodies. Spherical structures containing membranous and mitochondrial residues and numerous free ribosomes derived from spermatids from which they have separated. Their role in spermatogenesis is not yet clarified but may be regulatory; they are autolysed and perhaps phagocytosed by sustentacular cells, as the mature spermatozoa separate.

Blood Supply :-

Because of common embryologic origin, the blood supply of testes like that of kidney is derived from Aorta, just below the renal vessels (the testicular arteries) at L2 level, the testicular arteries transverse through the spermatic cord to the testis, where they anastomose with cremasteric arteries and artery to vas and thus supply the testes. Thus even after division of testicular artery, vascularity is just enough to maintain viability of testis remains.

Venous drainage :-

The veins from the testes form the pampini from plexus which passes upwards along the spermatic cord. At the level of the deep inguinal ring the veins unite to form a single testicular veins on the right side the testicular vein drains into the inferior vena cava and on the left side to the left renal vein.

The entry of left testicular vein into left renal vein is at a right angle and there is no valve at this region. Hence, increased hydrostatic pressure or obstruction may result in dilatation of the pampiniform plexus of veins producing varicocele, which usually occurs on left side.

The other anatomical reasons attributed to this are

- Descending colon overlying left testicular vein.
- The left renal vein passes anterior to the aorta and posterior to the superior mesenteric artery. The angle between these two arteries may form a compressive “Nutcracker” effect.
- The left common iliac vein is crossed by the right common iliac artery. Increased pressure in the iliac veins is transmitted to the pampiniform plexus through the veins of vas deferens.

Lymphatic drainage :-

The testicular lymphatics pass along the spermatic cord and inguinal canal into the common iliac and para aortic nodes. The periaortic nodes have communication with those of opposite side, the mediastinal nodes and the left supra-clavicular nodes. In men peri aortic nodes extend from the level of T11 to L4 vertebra.

Nerve Supply :-

Testicular nerves are derived from the aortic and renal plexus (sympathetic) which communicate intum with solar plexus. So in traumatic injuries of the testis abdominal pain may be the presenting symptoms and intra abdominal disease may cause referred pain to the testis as in ureteric colic.

EPIDIDYMIS

It is a crescent shaped organ lying near the posterior border of testis. It is a coiled structure which may be 12 to 19 feet long.

It is divided into 3 segments

1. Head (Globusmajor)
2. Body
3. Tail (Globus minor)

The head is situated at the upper pole of testis on its posterior aspect. The body and tail are a single tube with the tail attached to inferior extremity of testis.

Most of the epididymis is covered by the tunica vaginalis (visceral layer) except near the hilum where the vasdeferens begins and vessels enter the testis. This forms a pouch / slit, known as the "Sinus of epididymis; it is attached to the posterolateral surface of the testis by

12-20 small efferent ductules, which become convoluted and enlarged to form a series of conical masses known as lobules of epididymis, which together form the head of epididymis.

Each lobule consists of a single convoluted duct, 15 to 20cms long, all of which open into the duct of epididymis with complex convolutions forming the body of epididymis. It increases in diameter and thickness as it approaches the tail of epididymis where it becomes the vasdeferens.

Histology :-

Epididymis is lined by pseudostratified columnar epithelium with microvilli protruding into the lumen (stercocilia)

Blood supply :-

The medial surface of each epididymis attaches to the terminal portions of the spermatic cord through which it receives blood vessels, lymphatics and nerves. The arterial supply is mainly from testicular artery and few branches from artery of vas.

Nerve Supply :-

Nerve supply is by sympathetic fibres of celiac ganglion via testicular artery.

Lymphatic Drainage :-

Lymphatic drainage is along with testicular lymphatics.

Function :-

Storage and maturation of the spermatozoa.

VAS DEFERENS

This is a thick, cord like, muscular tube about 18” long and 2 to 3mm in diameter. Because of its thick musculature it is easily palpable through the tissues of the cord and scrotum. It is related anteriorly to the anterior/spermatic group of veins surrounding the testicular artery and the remnants of processus vaginalis.

It has two parts

Straight portion :- Starts at the level of the upper extremity of the testis and ends at the ejaculatory duct.

Convolutd portion :- This is formed at the lower extremity formed by the joining of straight portion of epididymal tubules.

Except for the arterial supply which is derived from the artery to vas deferens branch of the umbilical or internal iliac artery. Venous drainage and lymphatic drainage are similar to that of testies.

Function :- Transport of spermatozoa to the ejaculatory ducts.

SPERMATIC CORD AND ITS COVERING

The spermatic and suspends the testicles and the attached epididymis in the scrotum, extending from the deep. Inguinal ring to the posterior border of testis (postero-superior margin). The spermatic cord traverses the inguinal canal, having the walls of the canal as its boundry and ilio-inguinal nerve in the floor of the canal. In passing through the canal it acquires coverings from the layers of the abdominal wall.

Contents:-

Vas deferens, internal and external spermatic arteries, the pampiniform plexus of veins, testicular and epididymal hypogastric plexus branches.

Blood supply :-

From adjacent vessels (testicular artery, artery to vas and cremasteric artery)
Lymphatic drainage :- Along with testicular lymphatics. The coverings of the cord are supplied by cremasteric artery a branch from inferior epigastric artery. Venous return is by cremasteric vein into inferior epigastric vein. The lymphatics from the coverings of the cord drain into the external iliac group of lymph nodes.

Post-natal growth and development of testis :-

It is divided into three phases

1. Static phase – from birth to 4 years
2. Growth phase – from 4 to 10 years
3. Development or maturation phase – 10 years to puberty

Physiology of tunica vaginalis

Tunica vaginalis testis is an invaginated serous sac and like any other serous cavity in the body. It has a visceral and parietal layer. These two layers are separated by a potential cavity. The opposed surfaces are smooth and glistening. The cavity contains a thin layer of fluid to reduce friction. The lining membrane is composed of a single layer of flattened endothelial cells supported by delicate areolar tissue. It forms a smooth glistening surface, apt to perform the function of preventing injury to the testis by constant rubbing with the medial aspect of the thigh. The fluid in the tunica vaginalis is kept in balance by the osmotic pressure, the colloid oncotic pressure of the blood. An increase in the intracapillary blood pressure or damage to the capillary endothelium increases the amount of fluid, which is of non-inflammatory origin and is called the transudate. Normally fluid from the sac is drained by the lymphatics in the parietal layer of the sac, as there are no or few lymphatics in the parietal layer of the sac, as there are no or few lymphatics in the subserosa over the testis and the epididymis. Any hindrance with this normal mechanism either in the form of increased production or decreased absorption leads to the formation of hydrocele.

CLASSIFICATION OF CYSTIC SWELLINGS OF SCROTUM

I. Anatomical Classification

a) Swellings from skin and subcutaneous tissue

- ✓ Sebaceous cyst
- ✓ Scrotal wall abscess

b. Swellings from tunica Vaginalis

- ✓ Primary vaginal hydrocele
- ✓ Congenital hydrocele
- ✓ Infantile hydrocele
- ✓ Bilocular hydrocele
- ✓ Haematocele
- ✓ Pyocele
- ✓ Chylocele and

c) From the tunica albuginea (Very rare)

- ✓ Tunica albuginea cysts

d) From the testis

- ✓ Simple testicular cysts
- ✓ Intratesticular epidermoid cyst
- ✓ Cystic dysplasia
- ✓ Dermoid cyst
- ✓ Cyst of appendage of testis

e) From the epididymis

- ✓ Epididymal cysts
- ✓ Spermatocele

f) From the processus vaginalis and spermatic cord

- ✓ Encysted hydrocele of the cord
- ✓ Funicular hydrocele
- ✓ Hydrocele of the hernial sac
- ✓ Lymphavarix

II. Aetiological Classification

a. Primary or idiopathic

- ✓ Primary vaginal hydrocele
- ✓ Congenital hydrocele
- ✓ Infantile hydrocele
- ✓ Encysted hydrocele of the cord
- ✓ Funicular hydrocele
- ✓ Hydrocele enbiasac
- ✓ Tunica albuginea cyst
- ✓ Cyst of appendage of testis
- ✓ Epididymal cysts

b. Secondary or acquired

- ✓ Haematocele
- ✓ Pyocele
- ✓ Chylocele
- ✓ Secondary hydrocele
- ✓ Simple testicular cysts
- ✓ Intratesticular epidermoid cyst
- ✓ Dermoid cyst
- ✓ Spermatocele
- ✓ Lymph varix
- ✓ Hydrocele of hernial sac

III. CLINICAL CLASSIFICATION

A) Translucent & Non-translucent

I. Translucent

- ✓ Primary vaginal hydrocele
- ✓ Infantile hydrocele
- ✓ Congenital hydrocele\
- ✓ Epididymal Cyst
- ✓ Spermatocele

II) Non-translucent

- ✓ Haematocele
- ✓ Pyocele
- ✓ Filarial hydrocele
- ✓ Chylocele
- ✓ Thicksac Hydrocele
- ✓ Turbid fluid

B) Symptomatic and Asymptomatic

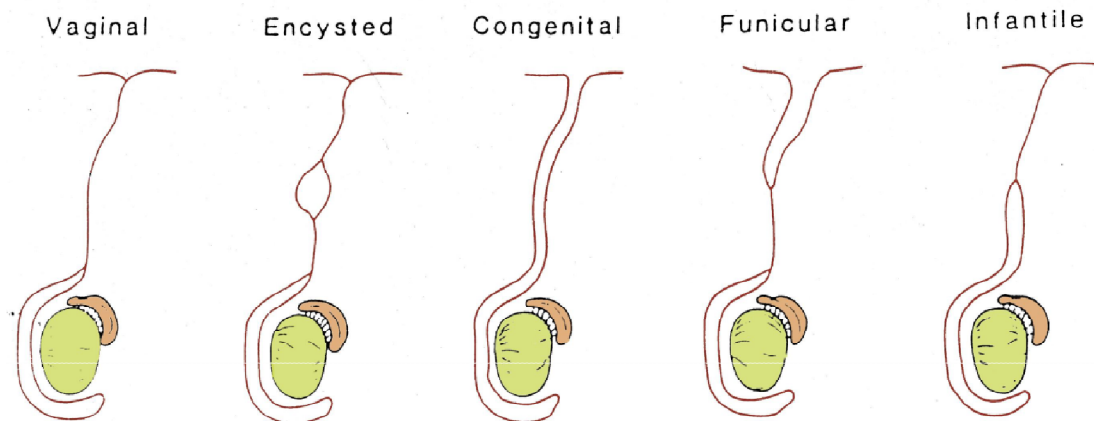
i) Symptomatic – scrotal wall abscess

ii) Asymptomatic – Hydrocele

- Epididymal cyst
- Spermatocele

HYDROCELE

Hydrocele is a collection of serous fluid in some part of the processus vaginalis. Usually the tunica; It is the commonest cause of cystic scrotal swelling occurring in all ages.



The processus vaginalis and different types of hydrocele.

Classification of Hydrocele

I. ETIOLOGICAL CLASSIFICATION

i) Congenital – congenital hydrocele

ii) Acquired

a) Primary or Idiopathic

- Primary vaginal hydrocele
- Infantile hydrocele
- Encysted hydrocele

b) Secondary (due to diseases of testis or epididymis)

- Acute/Chronic epididymo orchitis
- Tuberculosis of the testis and epididymis
- Syphilis
- Filariasis

- Mumps orchitis
- Gonococcal infection
- Malignancy of Testis
- Traumatic
- Medical Causes (C.K.D, Nephrotic Syndrome, End stage liver Disease)

II. ANATOMICAL CLASSIFICATION

- 1) Primary Vaginal hydrocele
- 2) Congenital hydrocele
- 3) Infantile hydrocele
 - Interstitial hydrocele
 - Abdominoscrotal hydrocele
- 4) Funicular hydrocele
- 5) Encysted hydrocele of cord
- 6) Hydrocele of hernial sac
- 7) Diffuse hydrocele of the cord
- 8) Hydrocele of the canal of nuck
- 9) Hydrocele of the testis.

III. CLINICAL CLASSIFICATION

A) Translucent and non-translucent swelling

- 1) Translucent swelling
 - Primary vaginal hydrocele
 - Congenital hydrocele
 - Epididymal cyst
 - Spermatocele
 - Cysts of appendix of testis

2) Non-translucent swelling

- Epididymo orchitis
- Haematocele, Pyocele
- Tumour

B) Symptomatic and Asymptomatic

1) Symptomatic (painful)

- Torsion
- Acute epididymo orchitis

2) Asymptomatic (painless)

- Primary hydrocele
- Tumours

1) Vaginal hydrocele

It is a collection of serous fluid in the tunica vaginalis. Depending upon the change of the form of tunica vaginalis classified into

1) Vaginal hydrocele perse

2) Bilocular hydrocele

3) Hourglass hydrocele

4) Multilocular hydrocele

This is the commonest cause of scrotal swelling and occurs in men of all age groups, usually middle or elderly age groups common in tropical countries. Presents with painless scrotal swelling, sometimes they attain very large size. About 5% cases may have associated inguinal hernia. The fluid accumulates slowly without pain and a dragging sensation is felt in the groin. It may involve only one side or both sides, being slightly more frequent on the right side. It appears as a pea shaped swelling, larger below than above and tapering sharply at the cord. It cannot be pushed into

inguinal canal unless it is of bilocular type. The upper pole can be palpated at or just below the external inguinal ring. In large ones the tunica vaginalis may be so tensely distended that the testis cannot be identified. The scrotal skin is tense and shiny.

In a very large hydrocele especially when bilateral the penis may be withdrawn in to the distended scrotal skin and its position is marked by a puckered dimple. The penis appears to be shortened as the hydrocele enlarges and extends upwards into the scrotum as opposed to carcinoma of the testis in which the penis appears larger. It transilluminates light held against scrotal wall. This method is diagnostic rather than aspiration.

2) Congenital Hydrocele

The processus vaginalis persists in its entire length communicating with the peritoneum by a small opening, which is not of sufficient width to allow herniation to occur. Different authors have used different nomenclatures. Ian Aird (1956) used the term “communicating hydrocele” Browne Named it “Fluid inguinal hernia” The one characteristic finding here is the fluid goes back into the abdominal cavity at night, but when we try to reduce it, it cannot be emptied. This is due to an “Inverted ink bottle effect” at the internal ring. In bilateral cases ascitis or ascitic tubercular peritonitis should be suspected.

Clinical features

Usually presents at an early age or childhood as a painless scrotal swelling which is translucent. It has to be differentiated from indirect inguinal hernia by the fact that it fills up from below upwards on coughing (if in an inguinal hernia the swelling descends from above

downwards) An inguinal hernia may be reduced easily.

3) Infantile hydrocele

This is a misnomer; It does not necessarily appear in infant. In this condition the tunica and the processus vaginalis are distended up to the deep inguinal ring but do not communicate with the general peritoneal cavity, can occur at any age.

4) Funicular Hydrocele

In this condition the processus vaginalis remains patent up to the top of the testis, where it is shut off from the tunica vaginalis. The swelling is inguinal, rather than scrotal. Testis can be felt separately, other features are similar to this of congenital hydrocele.

5) Encysted Hydrocele of the cord

This is a smooth, oval cystic swelling along the spermatic cord situated either in the inguinal or the inguinoscrotal region and felt separate from the testis. It is mobile transversely and with traction of testis descends down and becomes less mobile. Here the processus vaginalis is obliterated both near the testis and the peritoneal cavity with the remaining part situated in between.

6) HYDROCELE OF THE CANAL OF NUCK

It is a swelling situated in the inguinal region in females. The cyst is in relation to the round ligament. It may stimulate incarcerated inguinal hernia. Although irreducible it is mobile in all directions, it is rarely painful. This seldom transmits light as the external oblique covers it.

7) Abdomino-scrotal hydrocele (Hydrocele enbisac/bilocular hydrocele)

The condition was first reported by Dupuytren (1834) who suggested upward extension of a scrotal hydrocele, suggestion that it was infantile hydrocele. Extending up to the internal ring appears plausible, but it does not explain how it grows extra peritonially. A bottleneck mechanism at the external ring, mentioned by Cabot (1936), does not appear as a satisfactory explanation (Tanga et al 1973). The key to etiology in this is a hydrocele in the inguinal canal. If this extends into the internal inguinal ring it will get nipped every time the patient strains by the normal slide valve mechanism of the canal. As the arching fibers of the internal oblique and transverses muscle actively contract to close the inguinal canal, a portion of the sac containing the fluid gets pinched like a fluid filled balloon, resulting in forced expansion of the pinched portion around the peritoneum. Since such a combination of circumstance unlikely to be common it explains the relatively uncommon occurrence.

The number of cases of abdominoscrotal hydrocele reported in the literature is more than 90, of which 21 are from India. It was first described by Dupuytren (1834) and called it as hydrocele en-bissac, hydrocele magna and bi-locular hydrocele are the other names used. It was Bickle (1919) suggested the term abdomino-scrotal hydrocele.

Classification

1) Complete abdomino-scrotal hydrocele

a) Direct type

b) Indirect type

2) Incomplete abdomino-scrotal hydrocele a) Abdomino – inguinal hydrocele

b) Inguino-scrotal hydrocele

8) Hydrocele of the Hernial sac

Sometimes the neck of a hernial sac becomes closed by adhesions or plugged with omentum, this results in retention of the serous fluid secreted by the peritoneum of the hernial sac resulting in a hydrocele.

9) Hydrocele of the testis

This is a localised accumulation of fluid under tunica albuginea. This fluid does not communicate with the potential vaginal sac.

ETIOLOGY

Hydrocele can be produced in four ways

1. By excessive production of fluid in the sac - Excessive secretion of fluid in vaginal sac may be secondary to infection.
Example : - Epididymo orchitis, testicular injury secondary to testicular neoplasm.
2. By defective absorption of hydrocele fluid by the tunica vaginalis – This appears to be the most common cause of the common variety of primary hydrocele. But the reason for the defective absorption is obscure. Damage to the endothelial wall by low-grade infection seems to be the probable explanation.

3. By interference with the drainage of fluid by the lymphatic vessels of the cord –
In filariasis due to inflammatory changes and secondary fibrosis, there is damage to the superficial and deep lymphatic plexus of the parietal layer of the tunica vaginalis. This leads to impaired absorption from the sac.

Interference with normal lymphatic drainage due to

- a) lymph varix in the cord
- b) Decreased function of dartos and cremasteric muscle.

4. By connection with the peritoneal cavity.

PRIMARY OR IDIOPATHIC HYDROCELE

When there is no definite cause to account the production of hydrocele then it is known as primary or idiopathic hydrocele.

Three possibilities can be considered as the cause :-

1) Nervous

2) Vascular

3) Lymphatics

Increased nervous stimulation would probably lead to excessive endothelial secretion (as would increase vascularity) but not of sufficient amount to produce a hydrocele. Most authors are satisfied with a simple explanation such as “an imbalance between accumulation and resorption of fluid within the tunica and vaginalis” the imbalance is primarily a resorptive impairment as proven by ozdilek who injected indigo carmine into the sac in the patients with hydrocele and compared the resorptive time with that of controls in producing renal excretion of the dye. Wallace reviewed the historical and contemporary ideas on the subject and concluded, “it was the result of lymphatics obstruction and that the two most probable underlying causes were a low grade inflammatory lesion of the epididymis and trauma to the scrotum”

Considerable evidence of acquired in favour of absorption from the tunica vaginalis being via the lymphatic system rather than blood capillaries.

1. Although spermatic veins contain no valves, raised intra abdominal pressure, ascitis and hert failure are not associated with hydrocele.
2. The very slow re-accumulation of fluid after tapping is against vascular mechanism.
3. The Urinary excretion of chemicals injected into the normal tunica vaginalis is lower than would be expected if absorption were from blood capillaries and absorption has been found to be even slower from primary hydrocele.

Entry of proteins into hydrocele have been studied by means of intravenously by means of intravenously injected radioactive iodine labeled human serum albumin (I131RIHSA) and results compared with the entry of titrated water and these findings contrasted with the transport of protein into the normal tunica of the patients undergoing herniorraphy (Zas cellers and Annis). Their observations are compatible with the theory of impaired lymphatic drainage as the cause of primary hydrocele in adults and are against over production of fluid.

Rinker and Allen convincingly demonstrated the scarcity and absence of lymphatics in the parietal layer of the sac of hydrocele in contrast with the abundance of lymphatics in the normal vaginal sac.²⁰ It is not known how this lymphatics system is destroyed to cause hydrocele. It is presumed to be due to non-specific inflammation of the epididymis or testis involving tunica vaginalis. This inflammation may be chronic from the beginning or an acute or subacute inflammation or congenital absence of lymphatics or hypoplasia of lumphatics, which becomes chronic.

SECONDARY HYDROCELE

Hydrocele secondary to the presence of underlying pathology of testis and Epididymis. When there is a definitive cause to the development of hydrocele this type of hydrocele is called secondary hydrocele. This type of hydrocele is predominantly of exudative type.

It is believed to be due to excessive production of fluid within the sac and is of usually short duration and small size. The fluid may be serosanguinous if there is an underlying tumour.

1) Viral infection (Mumps)

Orchitis may be result from viral infection in association with excess accumulation of fluids within the compartment of tunica vaginalis. In acute hydrocele of the mumps, usually supportive treatment is advised with no aspiration, as there are chances of introducing a secondary infection.

2) Tuberculosis :-

Tuberculous orchitis is always secondary to tuberculous epididymitis. Kidney being the primary focus of infection within the urinary tract while sometimes in the prostate. Majority commences insidiously; the frequency with which the globus minor is first attached indicates that infection is commonly retrograde along the vas deferens from an infected seminal vesicle.

Blood borne infection commences in the globus major. An early manifestation is discrete indurated, slightly tender nodule in the globus minor rarely in the globus major. As the disease progresses other nodules appear and eventually the entire epididymis becomes involved and is felt as a firm, craggy often painless mass situated behind the testis. Testis is felt normal. In 30% of cases a lax secondary hydrocele is present.

3) Gonococcus :-

In the pre-antibiotic era Gonococcal epididymo-orchitis was commonly met with and this was the common predisposing factor in the development of hydrocele. As the infection was taken a retrograde spread from the urethra and it reaches the testis through epididymis. But today after the invention of antibiotics this cause is very much diminished.

4) Syphilis :-

'Syphilitic gumma may occur within the testes, which cause syphilitic orchitis, which in turn causes collection of fluid into the tunica vaginalis.

5) Trauma :-

Trauma due to a direct kick on the scrotum or the trauma caused due to the surgical procedure, like herniorrhaphy or prostatectomy.

6) Filarial hydrocele :-

Filariasis accounts for the major role in the production of hydrocele fluid in tropical areas. According to Manson-Bahr (1950) absence of microfilaria in the peripheral smear does not rule out filariasis and filarial hydrocele the fluid may be clear straw colored, which may not contain microfilaria, since this is not a medium, particularly favorable for them. Usually filarial hydrocele follows repeated attack of filarial epididymitis and develops rapidly, gradually and can be large or small, frequently, they are bilateral. In early cases the hydrocele fluid is similar to that found in the idiopathic variety. In long standing cases if the fluid is placed in a tall glass after a few hours, a film of liquid fat (chyle) will be floating on the surface. This is rich in cholesterol and is derived from the rupture of a lymph varix into the tunica. The presence of chyle is proof-positive of the filarial origin of a hydrocele. Adult worm of the *Wuchereria bancrofti* have found in the epididymis removed by the operation or at necropsy on these cases. In long standing chylocele, dense adhesions formed between the scrotum and its contents.

It is also due to obstruction of lymphatics by *W. bancrofti* and calcified dead microfilaria.

The criteria which are highly suggestive of filarial hydrocele are

- Presence of chylous fluid
- Demonstration of microfilaria in hydrocele fluid or histopathologically in testis, tunica vaginalis sac, lymph nodes or lymphatics.
- History of filariasis
- Thickened cord
- Eosinophilia of more than 10%
- Thickened sac with cholesterol plaques.
- Lymphatic dilatation and interstitial edema demonstrated histopathologically in the testis, epididymis, tunica vaginalis sac or lymphnodes.
- Follicular and very vascular lymphoid cells aggregation demonstrated histopathologically in the testis, epididymis, tunica vaginalis sac or lymphnodes.

- Follicular and very vascular lymphoid cells aggregation demonstrated histopathologically in tunica vaginalis.

Now in a given case, if any one of the first two criteria is present, then it is quite clear that it is a filarial hydrocele. In the absence of the first two criteria if five or more of rest of the

criteria are present then it is considered as definitive of filarial hydrocele, if three to four criteria are present then it is considered as highly suspicious of filarial hydrocele and if less than three criteria are present, then it is considered as non-filarial hydrocele.

7) Erysipelas and Guinea worm infection cause hydrocele, which is very rarely seen.

8) Myxoedema :-

Myxoedema causes hydrocele, when primary myxoedema is corrected or treated the hydrocele also subsides.

9) Malignancy of testis :-

Hydrocele is formed due to the underlying neoplasm of the testis, which can be explained as sympathetic response to the tumor.

10) Post-herniorrhaphy hydrocele :-

It appears after an operation for inguinal hernia in 0.2% of cases possibly due to damage to lymphatic vessels of the tunica vaginalis which pass to the testis along the spermatic cord.

11) Hydrocele of the hernial sac :-

Neck of the sac becomes plugged with omentum and occluded by adhesions, resulting in hydrocele.

12) Hydrocele associated with metastatic colonic carcinoma to the testes.

13) Malignant mesothelioma of the tunica vaginalis testis presenting as acute hydrocele.

14) Hydrocele associated with nonhodgkins lymphoma of testes.

15) Unusual complication of CSF shunting, presenting as hydrocele due to the migration of eritoneal end of ventriculo-peritoneal shunt has been reported.

16) Hydrocele following internal spermatic vein ligation for varicocele can occur possibly due to lymphatic obstruction.

Differences between primary and secondary hydrocele

Particulars	Primary Vaginal Hydrocele	Secondary Hydrocele
Duration	Long	Short
Associated systemic Symptoms	Absent	Present
Bilaterality	Possible	Occasional
Tenderness on Examination	Absent	May be present
Cord	Normal	My be thickened
Nature	Tense, cystic	Lax, cystic
Testis, and epididymis	Not palpable separately	Can be palpated separately
Hydrocele fluid	Staraw or amber colored	Opaque
Transillumination	Positive	Negative
Treatment	Surgery	Treat the cause

Hydrocele fluid :-

It is a serous fluid, which is seen in tunica vaginalis. It varies as case happens to be, acute or chronic. In acute form it is moderate in amount, collects rapidly and is of varying degree of turbidity, being in some cases frankly purulent. It contains flakes, fibrin and numerous leucocytes. The fluid in chronic variety may collect so as to produce enormous distension of the scrotum. It is a clear, thin and watery, a yellow or straw color, odorless neutral in reaction. Specific gravity varies from 1.022 to 1.024. The concentration of inorganic ions reflects that extra cellular fluid and osmolarity similar to that of plasma. It contains sodium chloride and carbonate, the protein content is slightly lower than that of Plasma, particularly the alpha and gamma globulin which has a larger molecule than albumin.

It contains 6% albumin and a quantity of fibrinogen, but does not coagulate spontaneously. But, if a few drops of blood come in contact even with a large quantity of hydrocele fluid, the whole hydrocele clots firmly. Occasionally it may present a shimmering appearance due to presence of cholestral crystals. Occasionally tyrosine crystals are found. In some case, loose bodies may occur within hydrocele (Scrotal pearls)¹⁸. Probably owing to the deposition of salts, which become covered within fibrin. Endothelial cells, leucocytes, cholesterol crystals and sometimes spermatogonia make up the microscopic appearance.

In nearly all cases of filarial hydrocele the fluid is similar to that found in primay hydrocele. In long standing cases, if fluid is placed in tall glass. After a few hours, a film of liquid fat (chyle) will be floating on the surface. This is rich in cholesterol and is derived from rupture of lymph varix into the tunica. Microfilaria can be found occasionally. In long standing chylocele dense adhesions form between the scrotum and its contents and in a small percentage of cases filarial elephantiasis supervenes.

High protein concentration found patients suffering from epididymo-orchitis, low values were observed in disease associated with varicocele and inguinal hernia. Low concentration of sugar recorded in epididymorchitis.

Effect on Sac :-

The tunica vaginalis (sac) may be thin and thick, depending on the concentration of fluid (acute or chronic). In cases of long standing and especially in those which have been subjected to repeated tapping. An extra ordinary thickening may occur. The wall may become hard as catilage and calcareous plates may be deposited in it. Fibrinous adhesions may cause partial obliteration of the sac and may divide it into compartments.

Microscopic exasmination of the sac may show chronic inflammatory changes of different degrees of severity in thick walled sacs. Focal or diffuse and pervascular round cell infiltration may be present. More severe lesions may be found in sacs of filarial hydrocele and eosinophilic infiltration may be seen.

Effect on the Epididymis

The epididymis is hardly normal. It is chronically inflamed luster of its surface is lost. It is hypertrophic or atrophic or indurated and sclerotic. The appearance of epididymis is important from the point of etiology and it is supposed that.

Effect on the testis

The effect on the testis will be nill, however, when the pressure has been sever and prolonged there may be thickening of the surrounding fibrous tissue with flattening or atrophy of the gland. The atrophy is also partly at least due to obliteration of blood supply by the widening of the mesorchium of the testis. In some cases, when the pressure is removed, the testis may return to its original size.

CLINICAL MANIFESTATIONS AND DIAGNOSIS

1) Primary Vaginal Hydrocele

This is the commonest cause of scrotal swelling and occurs in all age groups. Most common in middle-aged men but occasionally seen in early childhood. It may be unilateral or bilateral, being slightly more frequent on the right side. The main and only complaint is the swelling of the scrotum and that is why the patient often presents with a huge painless scrotal swelling. It appears as a pea shaped swelling, larger below than above and tapering sharply at the cord. When at large dimensions it is after sausage shaped. One can get above the swelling if it is a pure hydrocele. The colour and temperature of the overlying skin are normal. But the skin is tense and shiny, with loss of normal rugosity. It is not tender, the fluid of the hydrocele surrounds the body of testis making the testis impalpable. In about 5% of cases inguinal hernia is associated with this condition. So one should not omit to look for impulse on coughing.

The penis will be pushed to the other side. In a very large hydrocele especially when bilateral, the penis may be withdrawn into the distended scrotal skin and its position is marked by a puckered dimple. The penis appears shortened as the hydrocele enlarges and extends upwards into the scrotum as opposed to carcinoma of the testis in which the penis appears larger.

On Examination :-

- Smooth scrotal swelling
- Can get above the swelling
- Cystic in consistency
- Fluctuant and translucent
- Testis cannot be palpated separately
- Aspiration yields amber or straw coloured fluid with specific gravity ranging from
- 1.002 to 1.024.

2) Congenital hydrocele

In congenital hydrocele the processus vaginalis remains patent and it freely communicates with the peritoneal cavity. But usually the communicating orifice remains too small for hernia to develop. The small opening prevents emptying of the hydrocele by digital pressure due to an “invested ink bottle” effect at the internal ring. In bilateral cases ascities or ascitic tubercular peritonitis should be suspected.

3) Infantile hydrocele : -

It does not necessarily appear in infants presents as a painless scrotal swelling. Examination reveals inguinoscrotal swelling which is cystic. Fluctuant and translucent. There is no impulse on coughing and the swelling is irreducible. Testis cannot be felt separately from the swelling. Where getting above the swelling is present.

4) Funicular hydrocele : -

Swelling is inguinal rather than scrotal, the testis can be felt separately from the swelling. Swelling disappears when patient is in supine position as the fluid in the funicular process drains into the peritoneal cavity. In erect posture the swelling reappears.

5) Encysted hydrocele of the cord : -

It usually presents as a scrotal swelling in relation to the spermatic cord. It is a smooth, oval cystic, fluctuant and translucent. The traction test is positive (ie, if the testis is pulled down, the swelling will also come down because of its attachment to the cord). The testis can be felt apart from the swelling.

6) Hydrocele of Hernial sac :-

It is due to plugging of the omentum at the neck of the hernial sac or neck occluded by adhesions. There is a cystic inguinoscrotal swelling separate from the testis. Irreducible with no impulse on coughing, fluctuant and translucent, history of initial hernia and separately palpable testis helps to confirm this condition from infantile hydrocele.

7) Hydrocele of the canal of Nuck : -

It is seen in females. The swelling is usually situated in the inguinal canal. It may stimulate incarcerated inguinal hernia. The cyst is in relation to the round ligament. Although irreducible it is mobile in all directions. Rarely it is painful and has been present for a considerable time. The cyst seldom transmits light as it is covered by external oblique fascia.

8) Abdominoscrotal hydrocele (Hydrocele en bissac)

This is a very rare condition seen in infants and children who present with scrotal swelling and abdominal swelling. Scrotal swelling is cystic fluctuant and translucent.

Positive cross fluctuation test is diagnostic of this condition.

9) Post Herinorrhaphy Hydrocele :-

It is a secondary hydrocele occurring after the surgery for inguinal hernia. It is due to the damage of lymphatic vessels of tunica vaginalis and is 0.2 % common. It is treated like any hydrocele.

SECONDARY HYDROCELE

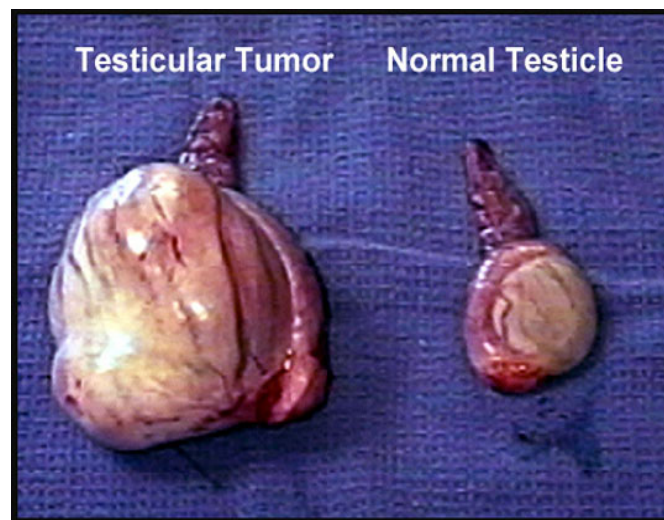
This is usually associated with acute or chronic epididymo orchitis, syphilitic orchitis, and 30% of malignant growths. Secondary hydrocele rarely attains a big size and confirmation of secondary hydrocele is done by analyses of aspirated hydrocele fluid. The testis and epididymis is palpable. Usually the secondary hydrocele subsides with the primary lesions.

a) Tubercular Epididymitis : -

In this condition, there is nodular enlargement of the globus minor commonly or major or the whole of the epididymis. The nodules are hard irregular, craggy and tender. Later on the nodules soften and form a cold abscess which becomes adherent to the skin of scrotum behind and ultimately the abscess posteriorly bursts and forms sinus or ulcers. There will be fluid in the tunica vaginalis 30% of cases. On rectal examination. The seminal vesicles and the prostate are found to be hard and irregular. On cord CHAIN OF BEAD Appearance is seen.

b) Secondary to Testicular Tumour : -

Occurs in 10% of cases. The disease is insidious in onset, having duration of a few months. The patient presents a painless, smooth or nodular swelling of the testis, which is either uniformly firm or irregular in consistency having cystic area. Testicular sensation is lost in late stages. The spermatic cord is free in the early stage but, later extension of growth takes place along the lymph vessels of the cord. Lymphatic metastasis frequently occurs in pre and para-aortic nodes. Treatment is high inguinal Orchiectomy.



c) Filarial hydrocele

Produces subacute epididymo orchitis. The epididymis feels swollen firmer and slightly tender. The testis becomes enlarged firm slightly tender and loses to certain extent testicular sensation. Secondary hydrocele is present. Differentiation from tuberculous epididymitis is made by presence of a history of periodic fever, absence of craggy epididymis, absence of involvement of seminal vesicles on rectal examination, presence of eosinophilia and demonstration of microfilaria in the peripheral blood. The biopsy of epididymis may show W.bancrofti.

This is a collection chylous fluid in the tunica vaginalis. The fluid may contain microfilaria. The condition is suspected when in addition to the clinical picture of a hydrocele, a history of periodic attack of fever is obtained and the translucency is negative.

d) Chylocele:

Occurs in the coastal region. Fluid contains fat rich in cholesterol and is derived from ruptured lymph varix into the tunica. It is difficult to differentiate from Primary hydrocele.

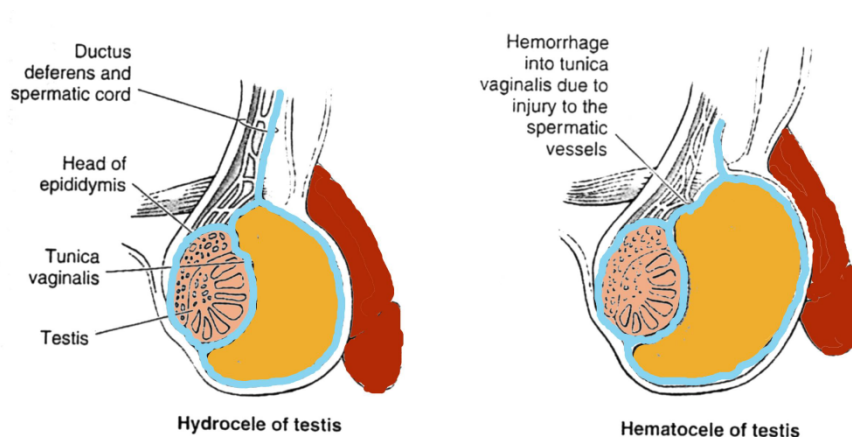
e) Lymph Varix : -

Is dilatation of the lymph vessels of the spermatic cord. This is characteristic feature of filariasis. There is filarial fever which shows periodicity and is associated with swelling of the spermatic cord. The spermatic cord gives rise to multilocular elongated cystic swelling, which is known as diffuse hydrocele of the cord.

Complications of hydrocele:

1. Infection
2. Pyocele
3. Haematocele
4. Atrophy of testis
5. Infertility
6. Hernia of Hydrocele sac
7. Calcification

10) Haematocele - Collection of clotted blood between the two layers of tunica vaginalis.



a) Recent Haematocele: -

Patient usually gives clear history of trauma or some procedure and presents with excruciating pain and sudden increase in the size of the scrotum.

On Examination

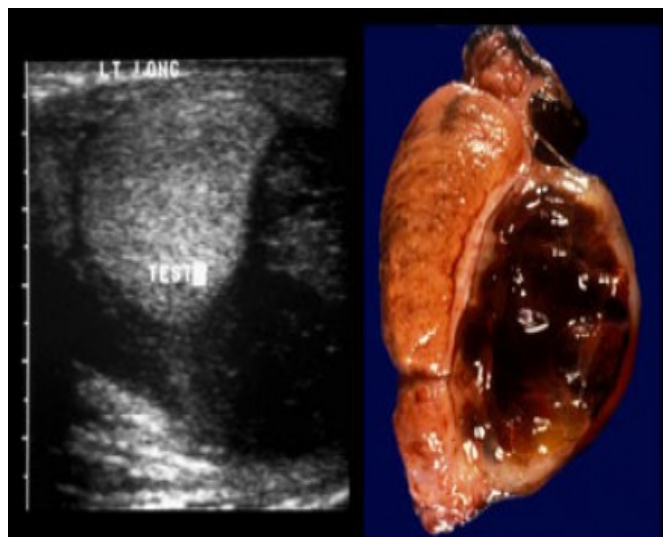
- Swelling in tense, tender, fluctuant and non translucent.
- Testis cannot be felt separate from the testis
- Aspiration yields blood / blood stained fluid following aspiration, the sac refills with pain.
- Early intervention is needed to prevent the complications.
- Treatment is Scrotum is explored and the clot is evacuated, bleeding vessels are ligated and eversion of sac is done under G.A.

b) Old clotted haematocele

Surprisingly history of trauma and pain in the scrotum are conspicuous by their absence in most of the cases. It is presumed that it develops due to slow, painless, spontaneous haemorrhage patient usually presents with a painless scrotal swelling.

On Examination

- Swelling is non-tender and hard and feels heavier
- It simulates neoplasm of the testies. No history of gradual enlargement of the swelling and absence of metastasis favour the diagnosis of this condition.
- Treatment is low Orchidectomy through scrotal approach.



11) Pyocele : -

Constitutional symptoms and signs of inflammation are markedly present.

On examination : -

- Commonest Cause is Iatrogenic i.e. aspirating the fluid of hydrocele.
- An acute tender swelling, which is fluctuant but non translucent.
- Skin and regional lymph nodes show evidence of inflammation of lymph nodes when enlarged are firm, discrete and tender. This condition should be differentiated from cellulitis of the scrotal wall. Pressure on the hydrocele through a comparatively healthy area will elicit tenderness in the case of pyocele but not in the case of cellulitis.

14) Sebaceous cyst : -

Patient usually present with multiple swelling of the scrotal skin. On examination : -

- Multiple non tender, smooth, swellings are present in the scrotal skin. Overlaying skin is not pinchable punctum may be present. Scrotal contents are normal.

Role of scrotal Ultrasound

Ultrasound of the scrotum can detect intrascrotal masses with a sensitivity of nearly 100%. It plays a major role in the evaluation of scrotal masses because of its accuracy of 98% to 100% in differentiating intratesticular and extratesticular pathology. This distinction is important in patient management because most extratesticular masses are malignant. All intratesticular masses should be considered potentially malignant until proven otherwise.

A direct contact scan is most commonly performed, but a water bath approach may also be employed. The patient is examined in supine position A7.5 MHZ or 10 MHZ transducer is commonly used because it provides increased resolution of the scrotal contents. Sonographically the normal testis has homogenous granular echotexture composed of uniformly distributed medium level echoes. The tunica albuginea is not usually visualized as separate structure. The septula testis may be

seen as linear echogenic or hypoechoic structure. The epididymis is normally isoechogenic or slightly more echogenic than the testis.

Intratesticular cysts have sonographic characteristics of benign simple cysts occurring in other organs. They are well defined, anechoic lesions with thin, smooth walls and posterior acoustic enhancement. Epidermoid cysts are generally well defined, solid hypoechoic masses. The mass typically has an echogenic capsule. Testicular abscess demonstrates, an enlarged testicle containing a predominantly fluid filled mass with hypoechoic or mixed echogenic areas. Sonography plays an important role in the evaluation of hydroceles. They are characteristically anechoic collections with good sound to transmission surrounding the anterolateral aspects of the testis. The fluid provides an excellent acoustic window for imaging the testis, however to medium level echoes from fibrin bodies or cholesterol crystals may occasionally be visualized moving freely within a hydrocele. Both hematoceles and pyoceles contain internal septations and loculations. Thickening of the scrotal skin and calcifications may be seen in chronic cases. Spermatoceles and epididymal cysts appear identical on ultrasound anechoic, well circumscribed masses with no or few internal echoes loculations and septations are commonly seen.

CYSTS IN CONNECTION WITH THE EPIDIDYMIS AND TESTIS

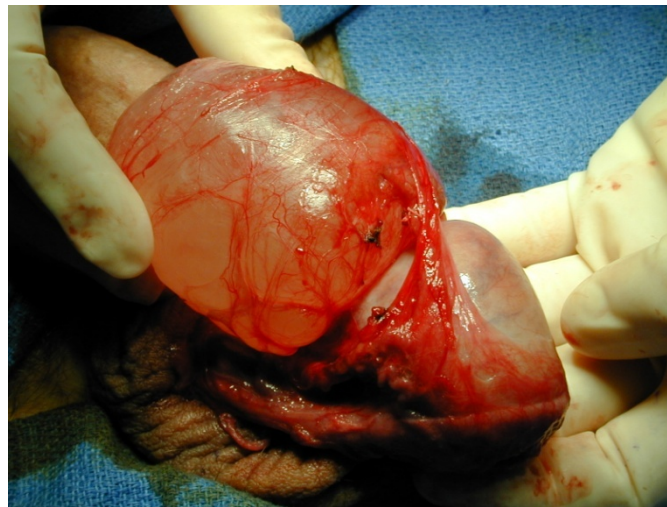
SPERMATOCELE : -

This is a unilocular retention cyst in relation to Vasa Efferentia (which connect the rete testis to the head of epididymis). It is derived from some part of the sperm conducting part of the epididymis, as a result of distal obstruction. The cyst is located near the head of the epididymis, it is filled with fluid resembling “barley” water and containing spermatozoa. Clinical manifestations

1. The patient presents with a scrotal swelling, which is usually small, only occasionally it may be big in size.
2. Usually there is no symptom
3. Being located at the head of the epididymis, it is always above and behind the testis.
4. The testis can be felt separately from the swelling. The patient feels the swelling like a third testis.

5. The swelling is softer than other cysts occurring within the scrotum.
6. The swelling is translucent.
7. The swelling contains barley water like fluid which contains Spermatozoa.
8. Treatment is excision.

Diagnosis is mainly done by clinically but to differentiate from degeneration cysts of epididymis, aspiration to fluid from the cyst done in case of spermatocoeles and the aspirated fluid resembles to barley water.



DEGENERATION CYSTS OF EPIDIDYMISS

Origin and Pathology :

Epididymal cyst are fluid-filled swellings connected with the epididymis. The fluid is crystal clear. Most cysts occur in men beyond the age of 40 years of age. The cyst is degenerative in origin but the organ undergoing degeneration may vary. It may be a cyst of the degeneration of either of the following structure.

1. The paradidymis (organ of Giraldes) which represents the remnant of the Wolffian body. This is the most common type.
2. The appendix of the testis (Sessile hydatid cyst of Morgagni), which represents the remnant of the Mullerian duct in the male.
3. The appendix of the epididymis (Pedunculated hydatid cyst of Morgagni).
4. The vasa aberrantia (of Haller), which are normal diverticula at the lower end of the vas deferens.

Clinical features

Cysts of the epididymis usually are found during middle life and due no doubt to their congenital origin, they are often bilateral. They are tense, as opposed to the softness of a spermatocele and they consist of an aggregation of a number of small cysts which on careful palpation feel like a bunch of tiny grapes. Cysts of the epididymis are situated behind the body of the testis and, on transillumination, because of the numerous septae; their brilliant translucency is finely bosselated giving an appearance like that of “**Chinese lantern**”. These cysts may vary in size from a few millimeters to 5-10mm diameter. They rarely reach the size of the large hydrocele. Complication of surgery – damage to the epididymis results in loss of spermatogenesis.

Solitary cysts : -

These are commoner than multiple cysts, may be unilocular or multilocular and may attain large size. They are located wither outside (usually) or inside tunica vaginalis between the body of testis and the head of the epididymis. They contain clear fluid and are therefore transilluminant.

Fertility : - Young adults with bilateral epididymal cysts may still be fertile (surgical removal of the cysts may make them infertile)

TESTICULAR CYSTS

Testicular cysts are discovered incidentally on ultrasound in 8% to 10% of the population. Cystic testicular lesions are not uniformly benign, because testicular tumours may undergo cystic degeneration because of hemorrhage or necrosis. The differentiation between a benign cyst and a cystic neoplasm is of utmost clinical importance. Teratomas are most common tumours to undergo cystic changes. Teratomas are usually multiple and vary in size. Solid components are often seen in association with the cystic masses.

There are two types of benign cyst : -

Cysts of the tunica albuginea and Intratesticular cyst. Cysts of tunica albuginea are located with in the tunica. Usually on the anterior and lateral aspect of the testis. They vary in size from 2 to 5mm and are well defined. They may be solitary or

multiple, unilocular or multilocular. They are discovered in patients in their fifth and sixth decades and are commonly asymptomatic. Histologically, they are simple cysts lined with cuboid or low columnar cells and filled with serous fluid. Their etiology is unknown.

Intratesticular cyst are simple cysts filled with clear serous fluid that vary in size between 2 and 18mm. They have sonographic characteristics of benign simple cysts occurring in other organs : they are well defined, anechoic lesions with thin, smooth walls and posterior acoustic enhancement. Hamm et. al. reported that in all 13 of their cases, the cysts were located near the mediastinum testis, supporting the theory that they originate from the rete testis, possibly secondary to post traumatic or post inflammatory stricture formation. Epidermoid cysts

Epidermoid cysts of the testis usually present between the second and fourth decades. They are usually asymptomatic and discovered incidentally. These tumours are round, firm, sharply demarcated on gross examination. Microscopically, the cyst is lined with stratified squamous epithelium. The adjacent testicular parenchyma is benign the histogenesis of these tumours is uncertain. The clinical behaviour of these tumours is benign patient usually presents with a painless testicular nodule. Although one third are discovered incidentally on physical examination. Diffuse painless testicular enlargement occurs in 10% of cases. These lesions are generally well circumscribed tumours lying beneath the tunica albuginea. The cyst is filled with flaky, cheesy white keratin.

Epidermoid cysts are believed to represent monomorphic or monodermal development of a teratoma along the line of ectodermal cell differentiation. These benign lesions can only be differentiated from pre-malignant teratomas through histologic examination. By definition, epidermoid cyst contain no teratomatous elements, and thus have no malignant potential.

Sonographically, epidermoid cysts are generally well defined solid hypoechoid masses. The mass typically has an echogenic capsule.



Cystic dysplasia :-

Cystic dysplasia is a rare congenital malformation, usually occurring in infants and young children, although one case has been reported in a 30 years old man, only six cases have been described. This lesion is believed to result from an embryologic defect preventing connection of the tubules of the testis and the efferent ductules. Pathologically, the lesions consists of multiple, intercommunicating cysts of various sizes and shapes, separated by fibrous septae. This lesion originates in the rete testis and extends into the adjacent parenchyma, resulting in pressure atrophy of the adjacent testicular parenchyma. The cysts are lined by single layer of flat or cuboidal epithelium of the reported six patients, two had ipsilateral renal agenesis and one had bilateral renal dysplasia.

Treatment : -

Benign cysts are treated by local excision (enucleation) with conservative testicle sparing approach. Malignant cysts are treated by orchidectomy.

Orchidectomy (High inguinal)

Through an incision above the appropriate inguinal ligament the inguinal canal is opened. The spermatic cord is freed from the internal spermatic fascia and mobilized to the deep inguinal ring, where it is divided between ligatures, the cord and the testis are then mobilized and removed.

PRINCIPLES AND METHODS OF TREATMENT

The aim of the treatment is to remove the accumulated fluid and prevent the recurrence, this can be achieved both by non-operative and operative line of treatment but, the operative type of treatment is the treatment of choice. Non operative line of treatment is not advocated because of the chance of recurrence and fro its complications. In the operative line of treatment the fluid is removed and recurrence is prevented by Excision. Eversion or plication of the sac.

Methods of treatment :-

1. Operative
2. Non operative – Indications- Very minimal hydrocele, Poor general condition of the patient, Anaesthetic risk.

Non Operative

- Tapping
- Tapping and injection of sclerosing agents
- Injection of Hydrocortisone
- injection
- Injection of hyaluronidase into the sac.

1) Tapping :-

Surgeons as long ago as the 13th century used instillation of sugar and ginger to produce sclerosis of cystic lesions of scrotum. Now a days it is an outdated procedure. It is only used in old aged persons who are unfit for surgery.

This procedure is contraindicated in hydrocele secondary to testicular malignancies because of risk of implantation of malignant cells in the needle track.

Preparation

The part is shaved and prepared.

Procedure

Under strict aseptic precautions fluid is tapped under local anesthesia with one percent xylocaine by trocar and canula or by a lumbar, puncture needle. If the testis is

anteverted the tapping should be done in the posterioinferior part. Usually inferior part is chosen. After tapping the testis should always be examined.

2) Tapping and Injection of sclerosing Agent

The lower part of the scrotum must not be used to tap and inject otherwise the sclerosants will slip out, by gravity on standing from the puncture hole into the cellular tissue and cause pain. Middle or upper part of the swelling and sac must be completely emptied by squeezing gently and then syringed out with a sclerosants fluids to clear any remaining fluid. About 20ml of sclerosants fluids should be injected for 400-600ml of swelling. Bandaging the swelling has an added advantage. The patients is seen again in five to six weeks and the scrotum retapped. A darker fluid indicates that the injection has had a good effort.

Sclerosing agents:

- 10% solution of tetracycline hydrochloride
- Antazoline
- 2.5% phenol
- 20% Glucose
- 3% polidoconol
- Talc
- Quinine hydrochloride 4gms
- Bismuth phosphate
- Urethane 2gms
- 2ml sodium tetradecyl sulphate can be injected after tapping.

When the hydrocele fluid is tapped 10ml of solution is injected into the tunica vaginalis sac, gentle massage employed to dispense the solution into the cavity. The scrotum is supported with suspensory bondages.

After tapping the hydrocele fluid and emptying the sac, 2ml of 3% polidoconol is injected into the scrotum. Then the scrotum is massaged for 5 minutes. Polidoconol a local anesthetic with a PH of 6 destroys the endothelium and there by sclerosing the wall. It has no known influence on spermatogenesis.

Ethanolamine oleate : -

It is also a sclerosants solution consisting of 5% ethanolamine oleate and 0.5% bupivacaine. The sclerosant is injected in the sac and the scrotum is massaged to ensure adequate distribution of the sclerosants throughout the cavity.

3) Injection of Hydrocortisone

Tapping the hydrocele fluid and injection of hydrocortisone 25 to 50 mg as a curative treatment for small hydrocele has been tried. Results of such therapy are considered to be satisfactory as the hydrocele disappears within three weeks long term results of such treatment are yet to be assessed. Injection of Hyaluronidase into the sac. This has been tried with varying results in small hydroceles

The advantages of injection therapy are :-

- It is an easy procedure
- The patient need not be hospitalized
- It is economical
- When surgery is contraindicated due to systemic diseases.
- In old individuals
- If the patient is not willing for surgery
- It is economical

COMPLICATION OF INJECTION THERAPY ARE :

1. Recurrence
2. Infection
3. Hematocele formation
4. Accidental Injury to testis and epididymis
5. Complications due to chemical irritants injected
 - Allergic manifestations
 - Chemical necrosis of the tunica and testis
6. Repeated tapping may result in adhesions making future operation difficult.
7. This procedure cannot be followed in all cases, especially of the long standing, thick walled variety.
8. Scrotal Abscess / cellulitis

9. Pyocele

Indications for Surgery:

1. Disturbing size
2. Disturbing pain
3. Male Infertility
4. Patient desire
5. Associated with pathology (Secondary Hydrocele)
6. Large size with stretching of mass → Skin ulceration.

Contra Indications for Surgery:

No true absolute contra indications except

1. Very minimal hydrocele,
2. Poor general condition of the patient.
3. Anaesthetic risk
4. Communicating hydrocele less than 1 year of age.

Operative Treatment

Anesthesia for operation on hydrocele

1. Local anaesthesia
2. Spermatic cord block
3. Spinal anesthesia

The posterior 1/3 of the scrotum is innervated by S3 segment; where as anterior 2/3 is innervated by L1

Spinal anesthesia though very good for operations below the level of umbilicus, it is not preferred in operations for hydrocele because immediately after heavy anesthesia, the blood pressure falls. Hence bleeding points are few. Though the Haemostasis is secured with care, after the effect of anesthesia is worn off the blood vessels of testes which arise from aorta directly bleed profusely and cause haematoma and along with other complications.

This fact is to be borne in mind while positioning the patient for heavy spinal anesthesia. Hence nitrous oxide and oxygen is the anesthesia of choice.

Alternatively local infiltration with 2% xylocaine can be used along the line of incision and also the cord must be blocked.

Operation for Hydrocele :

The aim of the surgery is to get rid of the fluid and to obliterate the space forever and prevent recurrence.

Various operations have been designed :

They are,

1. Eversion of sac
 - **JABOULAY**
2. **Lords** plication operation
3. Subtotal excision of sac
4. Partial Excision and eversion of sac - **JABOULAYS**
5. Window operation of **OZDILEK**
6. **SOLOMON'S** extrusion operation
7. Treatment of Hydrocele in children
8. Treatment of hydrocele in aged
9. Treatment of monstrous hydrocele
10. Treatment of abdomino-scrotal hydrocele
11. Procedure proposed by JL **WILKINSON** for large hydrocele
12. Minimal dissection technique as proposed by **SHARMA AND JHAWAR.**

1) Eversion of Sac (Jaboulay)

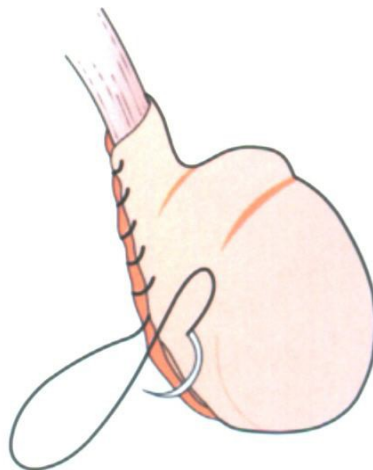
After eversion of sac, the secreting surface of the tunica vaginalis comes in contact with the subcutaneous tissues of the scrotum from which any fluid that may be secreted by the everted sac is immediately absorbed through the lymphatics. Gradually secreting endothelium changes its character owing to its friction with the subcutaneous tissue of the scrotum, so that no further secretions take place.

Preparation : -

The scrotum is shaved and scrubbed with cetavlon soap. After painting with spirit the scrotum is draped. Sterile gauze is wrapped round the scrotum and held tensely by the assistant.

Incision : -

The superficial incision is made over the skin of the scrotum for the length of the middle 2/3 of the long axis of the swelling. The incision is deepened until the sac haemostasis is secured. Care is taken not to puncture the sac during the maneuver of separation of the sac.

**Procedure :-**

If the sac is not punctured it is easily shelled out by sweeping movements of fingers insinuated all around aided by pressure and assistant will grasp it from posterior. Enucleation will be difficult in cases of adhesions, when they require excision by scissors. Trocar and canula is passed in the sac and fluid drained. The opening of the sac is widened and the sac is everted through the incision.

Haemostasis of the sac is secured. The collapsed tunica will form closely behind the testicles. The everted cut ends are sutured by a continuous catgut suture. The cut edges of skin are held apart and the testicle dropped into it without any torsion of the cord. The fascial layers are sutured by interrupted sutures and skin separately by interrupted sutures with absorbable material 2 '0'. A corrugated rubber drain may be left to drain the space if necessary. The scrotal bandage is applied.

Antibiotic are given for five days. Analgesic and sedative are given for a day. Drainage tube is removed after 48hours; stitches are removed on the 8th day. Patient is discharged and advised to use a suspensory bondage.

Hydrocele-en-bisac(Bilocular Hydrocele) :-

Hydrocele has got two inter communicating sacs, one above and one below the neck of the scrotum. It is cross fluctuant. Both hydroceles could be reached by a single incision in conformity with langer's line. Some surgeons operate each hydrocele separately. With this method of eversion many of the hydrocele will shrink to a respectable size in a few months.

2) Sub-Total Excision of the sac and Eversion

This is done for large hydroceles with a thickened sac. Incision is made in a circular fashion at the middle of the scrotum. The incision is deepened till the sac of tunica vaginalis is reached. Whole of the hydrocele is separated from scrotal wall and brought out. After drainage of the fluid, most of the excess tunica is excised. The tunica vaginalis is now sutured behind the testis as in Jaboulay's method and scrotal wound is closed as usual. Drainage may be required if there is excessive oozing, otherwise it should better be avoided. Post operative hematoma is quite common with this method.

3) Partial Excision and Eversion of the Sac

If sub-total or near total excision is not possible partial excision of the sac may be done with eversion. Haemostasis is secured by suturing the tunica vaginalis all around.

4) Abdomino Scrotal Hydrocele

Excision of the abdominal part of the sac and eversion of the tunica vaginalis is the treatment of choice.

Other operations :-

The necessity for other operations arose because of the complications observed during the above procedures. The complications observed are bleeding during operations. Injury to the cord structures and epididymis, torsion of the testis as

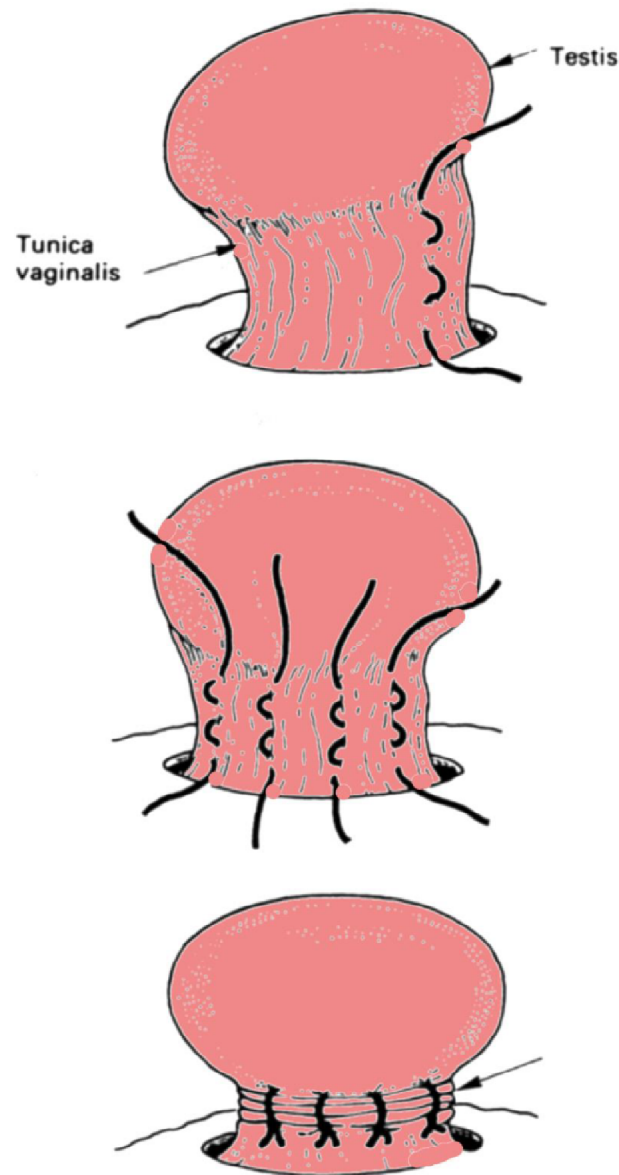
a result of faulty reposition. The commonest complication is haematoma, which increases the chances of post-operative infection, recurrences of the hydrocele and leaves some permanent thickening around the testicles. This produces heaviness and pain, which causes discomfort to the patient even after worst complication occasionally encountered is infection of haematoma. This frequently necessitates orchidectomy. All these could well be avoided with proper operative technique.

5) Lord's Plication Operation

It is a Day Care procedure. This is a bloodless operation for the radical cure of idiopathic hydrocele described by Peter.H.Lord.

In this procedure the hydrocele is grasped in the left hand in such a manner as to put the scrotal skin on the stretch and this grip is maintained until tunica vaginalis is incised. An incision 1 ½" long is made through the skin and dartos muscle, down to the tunica vaginalis without actually opening it. Hemostasis is secured through diathermy or by ligation. The hydrocele is emptied by incising the sac. The testis is delivered through the opening thus turning the tunica vaginalis inside out. Since the sac is not dissected from the scrotal coverings this procedure is bloodless. A series of 10-12 catgut stitches are applied from the cut edge of the tunica to the reflection of tunica from the epididymis and testis at a distance of

0.5cm between the bites. On tying the whole tunica is bunched into a ruff at the edge of the testis. The testis is pushed back into the scrotum, dartos and skin sutured. No drainage is necessary. Minimal dissection and tissue trauma reduces postoperative odema and pain in this procedure.



Bilateral hydroceles could be reached by a single incision over the midline. Though some surgeons operate each hydrocele separately.

6) Window Operation

This operation aims at removing the barrier of the lymphatic layer of the sac, exposing the testis to the scrotal lymphatics, which absorb the fluid as it is formed.

Procedure

Ozdilek (1957) described an operation in which he created a window or fenestration of about 3cms in diameter, in the sac by rolling up the edges of the incised sac. He believed that the fluid would drain into the fascial layers of the

scrotum and would be absorbed by the extra serous lymphatics. A small transverse skin incision is made over the center of Hydrocele with the hydrocele rendered tense, the Dartos and fascial layers are incised in the same line down to the serous membrane. The hydrocele is stabbed and fluid is drained. The edge of the opening of the sac is held with small hemostats and the parietal layer of the sac is stripped from the scrotal layers by blunt dissection for about 1 inch in all directions. The loosened position of the sac is tented through the incision in scrotum. The testis is not delivered out of the wound and only the sac that can be easily rent through the incision. A disc of about 2" in diameter is excised from the parietal wall of the sac. The fascial layers are closed in one layer with continuous plain catgut sutures. The Dartos muscle is closed in the same way as separate layer by continuous suture. Skin is closed with two or three plain catgut sutures. No drain is kept.

Window operation should be done. In patient with thick and densely adherent sac where stripping off the sac is not easy complications are negligible. Recurrence if at all occurs, it will be within the first month of the operation.

7) Treatment of Hydrocele in children :-

Prevention is better than cure. So many pediatric surgeons believe that a patent processus vaginalis is a potential hernia. Hence they explored apposite inguinal region in all cases of hydrocele and demonstrated the "glove sign" or the thickening of the cord in majority of cases and demonstrated the communication between the abdominal cavity and scrotum. By excising this future complications of the hernia or hydrocele are removed at one stroke during the same operation.

In first few months of life operation for hydrocele should not be advised since spontaneous sealing of communication may occur if however a hydrocele appear after the age of six months and gives rise to a tense swelling which persists after three months observation, then operation may be advised. Evidence of discomfort on the co-existence of a clinically obvious hernia is additional indications for employing surgery.

Surgical Technique

A small skin crease incision is made over the inguinal canal; the external oblique aponeurosis is defined and to expose the cremaster muscle within the inguinal

canal, it is opened in the line of its fibres. The external cremaster is now lifted up with two artery forceps and cut it for about 1cms, in the directions of its fibers; care is taken to avoid cutting any obvious cremasteric vessels. It is characteristic that although the processus is close, it has got the same intimate relationship as the vas and sac of the typical infants hernia presumably the small caliber and lack of gross distension has not caused overlapping the 'sac' upon the cord. The proximal end is followed through the internal ring for a short distance and its continuity with peritoneum demonstrated. It is then ligated at the level of peritoneum and divided, the processus often merge with a small hernial sac which is dealt with appropriately. The processus is next followed distally for a short distance and is divided without ligation in the vicinity of the external ring. Special care should be taken at this stage, since the vas may be drawn up with processus and damaged. Extensive dissection is not necessary, since the aim of the operation is simple interruption for processus and removal of any so-existing hernial sac. The cremaster is allowed to fall back into place. The hydrocele is now aspirated through the scrotum and the testis is drawn down into a good scrotal position to make sure that the manipulations of the operations have not displaced it upwards to become fixed in high position.

This operation causes minimal disturbance and the child may return home the next day with no special instructions on his activities.

8) Treatment of Monstrous hydrocele : -

In very large hydrocele much of the scrotal skin is left after operation that requires excision. Though the scrotal skin is elastic and is capable of shrinking considerably, in very large hydroceles partial scrotoectomy along with transposition of testis with long cord is a very useful procedure. By removing an elliptical wedge of the skin the subcutaneous tissue space is reduced. Haematoma formation is less likely. Most importantly it reduces the weight, relieves the dragging pain and reduces the size to a respectable one.

9) Treatment of Hydrocele in Aged : -

In very old patients with very old large and long standing hydrocele or hematocele, orchidectomy is the treatment of choice as the testis is atrophied from the

patients point of view this is not satisfactory, as they are dissatisfied to have lost a testicle who cannot be consoled by any kind of assurance as to its uselessness.

10) WILKINSONS operation for large scrotal Hydrocele Procedure

In large hydrocele the testicle is situated on the upper part of the posteromedial aspect of the sac. The operation consists of preparing a pouch between the parietal layer of tunica vaginalis and the internal spermatic fascia into which the testis is implanted. In a big hydrocele much of the original sac which is emptied is left in situ.

Following induction of anesthesia, the skin having been cleaned chlorhexidine; the scrotum is held so that the skin is tense. For a unilateral hydrocele a 3-4cms oblique anterolateral incision is made in the line and between the skin of the upper scrotum. For a bilateral case single transverse incision is placed at right angles to the median skin raphea about 4cms below the penoscrotal junction. A low power cutting diathermy with a fine needle, preferably angled is used to divide the Dartos and the layer made up of external spermatic fascia. Any tiny bleeding points are sealed off. When the tunica vaginalis is exposed, it is separated digitally from the internal spermatic fascia to form a pouch below the incision large enough to accommodate the testis. This is the natural plain cleavage and there should be no bleeding at all. The two layers of tunica though individually distinguishable, are closely adherent to one another and are picked up together. Through a small incision the contained fluid is aspirated or a trocar and canula may be used. In small hydrocele the testis may be extruded through the incision, but in a large sac Babcock's forceps are used to deliver into the surface. When the testis is drawn upwards through the skin, the naturally mobile tunica becomes everted until the edges of the sac, incision come to lie along side of the spermatic cord (in a small hydrocele the effect is to turn the sac inside out almost entirely ensheathing the cord).

The cut edges of this are then sutured together on the upper aspect of the cord, catching even the coverings of the cord. This has the dual effect of narrowing the sac incision sufficiently to prevent prolapse of the testis into the original sac, yet by leaving the latter in continuity with the extruded scrotal tunica a natural conduit is established.

Lanes forceps are used to hold the skin, Dartos and fascia as the testicle is tucked into the prepared pouch. The fascia and Dartos approximated with interrupted 2-0 chronic catgut.

Initially 16mm Micheal skin slips used for closure, but recently a continuous intradermal 2-0 Dexon suture has been found more satisfactory in terms of comfort, healing and postoperative care. The scrotum is gently pressed to expel any air or fluid, the skin is wiped with ether and “nobecutane” spray is applied to the wound and ribbon gauze applied, scrotal support over bandage is all that is required, the patient being discharged from hospital on the following day.

A relatively minor operation of partial eversion in which some residual sac is left in situ. The everted epithelium of the tunica vaginalis quickly loses its secretory nature, and becomes together with the testis, adherent to the internal spermatic fascia. In large hydrocele the fluid that for a time continues to be formed in the residual sac, fluid passes along side the ensheathed cord to be absorbed by the lymphatics. When the sac wall no longer separated by fluid, adherence and atrophy takes place, for large hydrocele there may be transient edema of scrotal lax skin. If there is redundant scrotal skin it is best left for three months, by which time some contraction has taken place and it is rarely necessary to remove it.

11) Surgery – hydrocele (simplified Minimal Dissection) (Sharma and Jhawar)

It has been quoted that tissue handling and dissection during hydrocele operation proportionately increase oozing of blood from the scrotal coverings with resultant tissue edema and hematoma formation. Hence the minimal dissection was devised.

Steps of Operation :-

The scrotum is scrubbed well on dilute antiseptic detergent example savlon and then wiped clean with ether, it is finally painted with spirit acriflavine.

Incision :-

The scrotum is held with its skin stretched by the assistant, 4cm incision made avoiding subcutaneous vessels.

Evacuation of the sac :-

The sac with all the fascial layers together is picked up with two tissue forceps and emptied with a trocar and cannula. The same holes is then extended on either side avoiding visible blood vessels. Through the opening polar delivery of testis is done.

Creation of space in the scrotum :-

To lodge the testis, with its entered sac back into the scrotum, a testis size space is created between the scrotal subcutaneous layers outside and the testicular fascial layers on the inside. This is easily done by introducing the two index fingers to do blunt separation of tissues and make room just enough to allow a tight fit of testis when reloaded in the scrotum.

Reloading of testis

The testis with its everted sac is put back into the new space in the scrotum very carefully.

Wound closed in layers :-

Complications like hematoma and sepsis are remarkably low, sutures are not used inside the scrotum thus saving on operation time and reducing an infection factor hence reducing hospital stay.

12) Endoscopic Hydrocele Ablation :-

A new technique for the treatment of hydrocele by percutaneous drainage and endoscopic ablation under direct vision.

Open surgical repair has been regarded as the standard treatment for symptomatic scrotal hydrocele. However postoperative discomfort and convalescence associated with this operation have led the surgeons (Urologists) to seek invasive alternatives. Hydrocele aspiration with chemical sclerotherapy, which is associated with complication like infection. Haematoma severe scrotal pain, requiring several days of bed rest, more over single treatment success rate is significantly lower.

In an effort and decrease the morbidity of hydrocele ablation they have, attempted a new endoscopic technique for the treatment of symptomatic hydrocele.

Procedure : -

Pre-operative prophylactic antibiotic is given (1gm cephalosporin) before. Under spinal anesthesia 1cm transverse skin incision is made at the most dependent portion of the left hemiscrotum. Through this incision 10 or 11mm laparoscopic trocar was inserted into the sac. The obturator is removed and 28F resectoscope with 30deg lens is inserted via the trocar. The surface of the testis, epididymis and scrotal wall were inspected. The hydrocele

fluid is also inspected and then the fluid drained through trocar sheath. Continuous flow of irritants is achieved by instilling glycine through the resectoscope and allowing it to drain through the insufflations part of the trocar. With proper video monitoring the parietal surface of the hydrocele is completely ablated using diathermy cautery applied via roller ball electrode or coagulation setting at 35V. Care is taken not to fulgrate the testis or epididymis. The ablated hydrocele sac is irrigated with antibiotic solution. The resectoscope is removed and ¼ inch penrose drain is placed. Drain is secured with 3-0 nylon and compression bandage placed.

The procedure takes about 25minutes. No postoperative complications or blood loss Drain removed on the next day and very minimal discomfort reported. The patient resumed his normal life after 2 days. Follow up for 6 months, and there was no evidence of recurrence.

13) TREATMENT OF FILARIAL HYDROCELE AND CHYLOCELES

Treatment is by rest, aspiration and drugs (Diethyl carbamezine 3.6mg/kg body wt/day for three weeks, abolishes microflaria and may kill adult worm also).

Surgical line :-

Principle :- Construction of new lymphatics pathways. This can be achieved by constructing cellular cutaneous bridges. Uniting scrotum to the thigh allowing scrotal lymph absorption through the uninvolved thigh.

In advanced cases, Excision of all involved skin with implantation of testis into the thighs and Primary skin grafting is done concomitant hydrocele is treated by excision of sac.

14) Funicular hydrocele :-

Inguinal canal is opened through inguinal incision. The sac is ligated at the deep Inguinal ring and divided. Distal part of the sac is pulled out and excised wound closed in layers.

15) Infantile Hydrocele :- Excision and eversion of sac.

16) Encysted hydrocele of the cord :- Inguinal canal is opened through the inguinal incision, the cyst is dissected of the spermatic cord and excised.

TREATMENT OF EPIDIDYMAL CYST

- Non operative – Injection treatment (Sclerosants)
- Operative – Excision

TREATMENT OF SPERMATOCELE

Spermatocelectomy is only indicated when the spermatocele is associated with unremitting pain or when the spermatocele has grown a large size.

Surgical Technique :-

The testis is delivered through a median raphe or transverse scrotal incision and the tunica vaginalis opened. The spermatocele is dissected free of the epididymis. The attachment of the spermatoceles to the epididymis is ligated to prevent extravasations of sperm and granuloma formation. The tunica vaginalis is re-approximated with continuous absorbable sutures and the Dartos and skin are closed in two layers.

Treatment of Haematocele :- Surgical exploration and evacuation of clot is the treatment of choice. In long standing cases the testis may be disorganized and damaged or small and atrophic due to pressure of the haematoma. In such cases orchidectomy should be done after taking consent.

Treatment for Pyocele :- Surgical exploration, drainage of pus and eversion / excision and eversion of the sac. Wound is closed with a drain. Antibiotics depending upon the culture and sensitivity / Bilateral Orchidectomy.

POST OPERATIVE COMPLICATIONS AND THEIR PREVENTION

Mostly operations are successful and the patients recover soon and go home. In certain number of instances, however complications develop. The complication will prolong the stay in hospital. The complications associated with cystic swelling of scrotum surgery.

1) Pain :- As the effect of the Anesthetic passes off the patient begins to feel the pain of operation. It will be relieved by sedation in the right time.

Faulty reposition of the testis (torsion of testis) will cause agonizing pain. If the pain is persisting re-exploration is indicated and the testis should be repositioned. If the testis is totally infarcted it should be removed. Pain will also be present in massive haematoma and in infected wound after 3 days.

2) Fever :- The temperature is often 1 or 2 degrees, even after clean surgery up to 3 days, this is aseptic traumatic fever.

If the fever is persisting beyond this period it is due to the sepsis in the wound.

3) Haematoma

This is a common post operative complications because of following factors.

- a) Inadequate / imperfect haemostasis
- b) Oozing from small vessels will be more often spinal anaesthesia wears off immediately after heavy spinal anaesthesia blood pressure falls. Hence bleeding points are few. Though haemostasis is secured with care, after the effect of anaesthesia is worn off, the blood vessels of the testis which arise from the aorta directly. Bleed profusely and cause haematoma along with its complications.

c) Testis is covered by loose scrotal layers :-

It is usually manifests with a sensation of pressure or pain in the scrotum (Shortly after the anaesthetic affect wears off). Scrotum will be big in size and firm in consistency. The haematoma can be prevented by meticulous haemostasis, scrotal support and tight bandage. Drain can be used if tissue dissection has been extensive. It will eventually reabsorb. Persisting haematoma is treated with evacuation of the clot.

4) Skin Oedema :-

It is due to abnormal increase in interstitial fluid following tissue, dissection and disruption of scrotal lymphatics, can be prevented by careful dissection and gentle handling of Tissues. Treatment consists of scrotal support and antifilammatory drugs.

5) Infection :-

Infection is a major cause of postoperative morbidity. The hallmark of developing infection is fever usually associated with leukocytosis. An increase in the pulse-rate occurs. The local signs of wound infection consists of pain, swelling erythema and soaking of the dressing.

a) Stitch abscess :- This is usually seen about 6th or 7th postoperative days. It is localized suppuration in relation to one of the stitches, localised blister will be formed. If the stitch is removed thick blood stained pus will come out.

b) Superficial infection :- The wound becomes red, swollen and the stiches are buried in the Oedematous skin. Treatment includes regular dressing of wound and antibiotics.

c) Deep infection or disruption of wound :- This is severe type of infection involving all the layers of scrotum. The wound is gaped and the testis is seen. Treatment includes regular dressing of wound debridement antibiotics and secondary suturing. Infection can be prevented by shaving the scrotum and cleansing it with savlon preoperatively and use of antibiotics.

6) Rarely sterility :-

a) Associated with spermatocelectomy and epididymal cyst excision

b) In few cases of long standing large Hydrocele flattening and atrophy of testis can occur.

7) Recurrence :-

Recurrence of cystic swelling of scrotum can occur in some of the cases. This is treated by surgery.



Picture No.1 Sac Exposed



Picture No.2 Draining of fluid



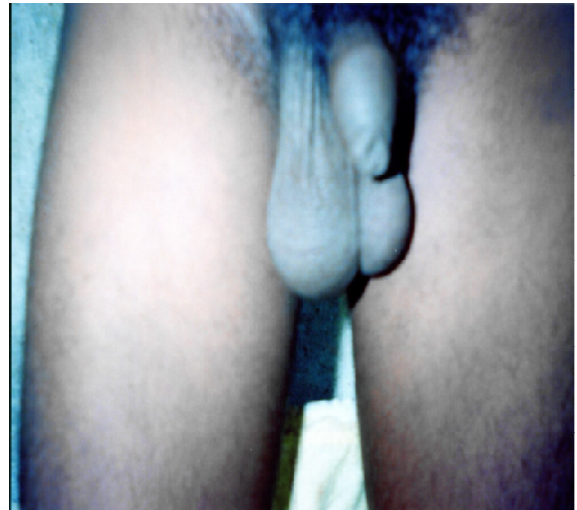
Picture No.3 Congenital hydrocele , herniotomy by inguinal approach.



Picture No.4 Testis exposed after Lord's Plication.



Picture No.5 Congenital hydrocele Picture No.6 Encysted hydrocele of the cord



Picture No.7 Huge Bilateral primary Picture No.8 Epididymal cyst vaginal hydrocele

METHODOLOGY

This study was undertaken in the Tirunelveli Medical College and Hospital. The cases admitted to the surgical wards from April 2014 to April 2015 formed the material for this study. During this period 60 cases admitted in various surgical units, were studied in detail as per the proforma.

Inclusion creteria and exclusion Criteria

1. Cystic swelling arising from the testis and its coverings, epididymis and spermatic cord are included in this study.
2. In Exclusion criteria, the inguinoscrotal swelling's and swellings from scrotal skin are excluded in this study.

Methods : -

Patients admitted with symptoms pertaining to the scrotal swelling were studied making use of the available facilities in the hospital.

The Methods of Study consists of

- Detail history taking
- Clinical examination
- Routine laboratory investigations
- Relevant special investigations in some cases
- Evaluation of Preoperative status and appropriate preparation for surgery.
- Surgical treatment according to the merits of the case as decided by attending surgeon, under suitable anaesthesia as decided by the anaesthesiologists.
- Operative findings
- Post operative course and management of post operative complications.
- Fluid analysis and histopathological examination in relevant cases.

Follow-up

Of the 60 cases, all were treated surgically. Surgeries were done after taking informed-written consent. Fluid was sent for analysis and culture in relevant cases, specimen was sent for histopathological examination in relevant cases. Corrugated

drain was used in some cases. The drain was usually removed after 72 hours. Post-operative scrotal support was given to most cases.

While discharging, each patient was educated about the disease and the study, and requested to attend the outpatient department for follow-up

RESULTS

Analysis of Data and Results

Observations and discussion of cases

Present study includes 60 cases, cases admitted to Tirunelveli Medical College Hospital between April 2014 to 2016.

Age incidence of cystic swellings of the scrotum

Sl. No.	Age group	No. of Cases	Percentage
1	1 – 10	0	0
2	11 – 20	0	0
3	21 – 30	19	31.6%
4	31 – 40	17	28.3%
5	41 – 50	8	13.3%
6	51 – 60	10	16.6%
7	61 – 70	6	16.6%
8	71 – above	0	10.0%
Total		60	

Table 1. Age incidence

The youngest is 21yrs of age and the oldest being 82yrs. The maximum number of cases seen in the age group of 21 – 30 years. Whereas minimum number of cases were seen after 70years and above.

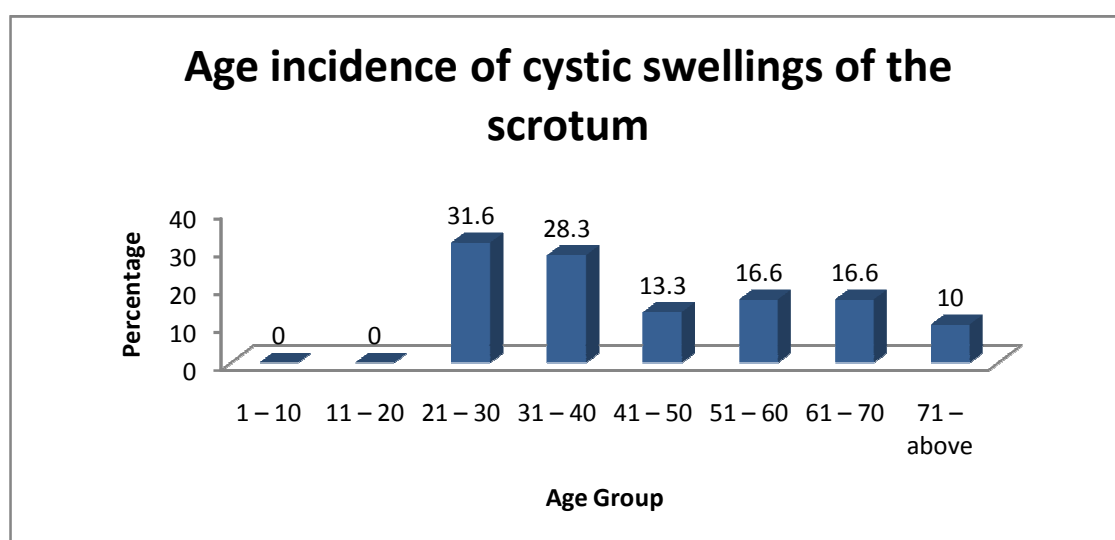


Chart No.1 (Age Incidence among various age groups)

Types of occupation of patients of present series

Sl. No.	Occupation	No. of Cases	Percentage
1	Coolie	23	38.8%
2	Business	7	11.6%
3	Agriculturists	13	21.6%
4	Student	12	20%
5	Others	5	8.3%
Total		60	

Table 2. Occupation of the patients

In this study, cystic swelling of the scrotum were more common in coolies, followed by agriculturists and students. Most of them were from poor social-economic class.

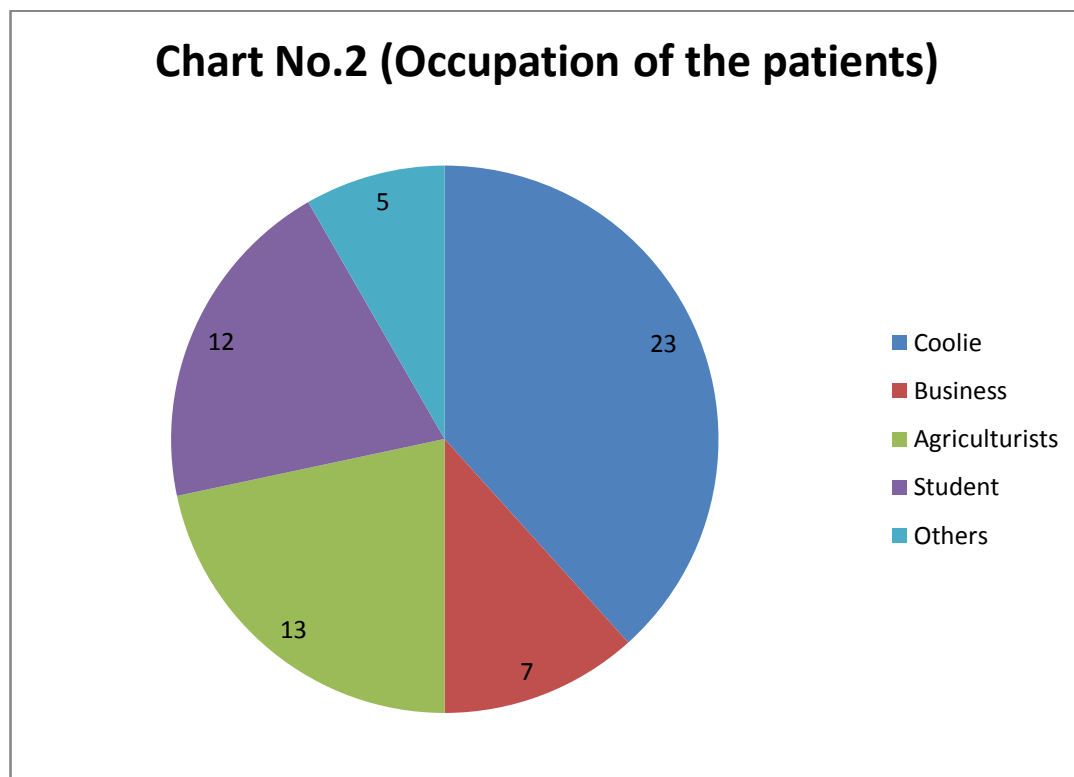


Chart No.2 (Occupation of the patients)

Duration of Swelling

Sl. No.	Duration	No. of Cases	Percentage
1	0 – 6 months	18	30%
2	6 – 12 months	30	50%
3	1 – 2 years	08	13.3%
4	2 – 3 years	00	0%
5	3 – 4 years	02	3.33%
6	4 year and above	02	3.33%
Total		60	

Table 3. Duration of swelling

In this study, in 50% of cases the duration of the swellings was 6 – 12 months; followed by 0 to 6 months in 30% of cases, 13% of cases presented between 1 – 2 years majority of the patients presented within 2 years of onset of symptoms.

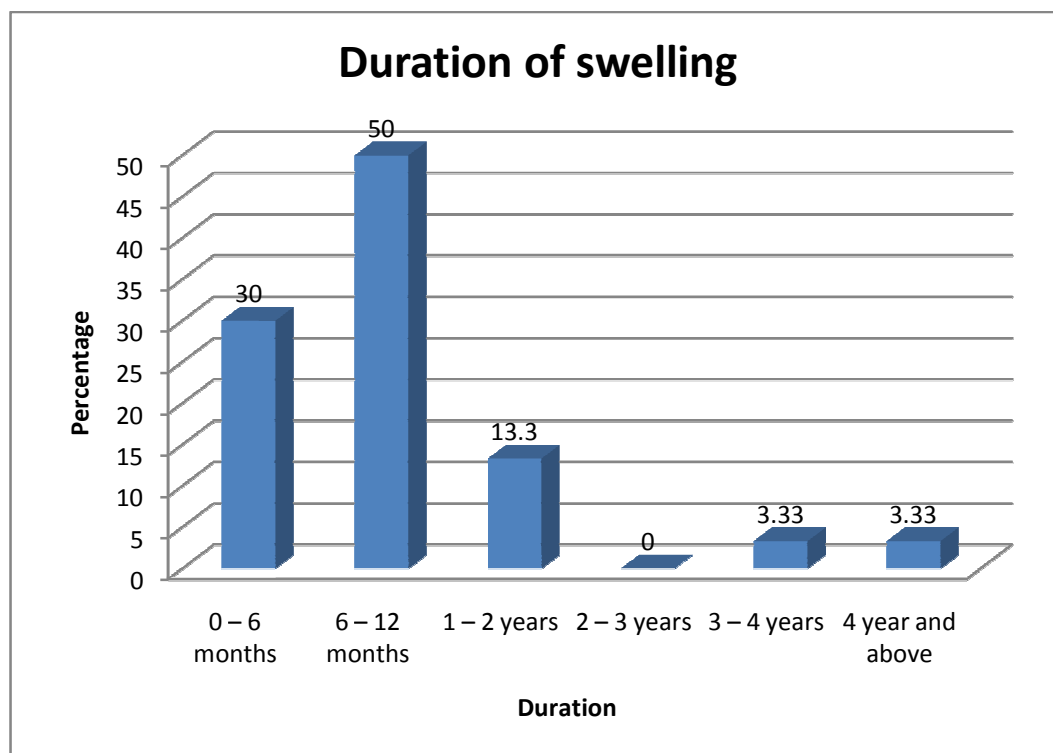


Chart No.3 (Duration of swelling)

The Distribution of cystic swellings in the present study

Sl. No.	Side	No. of Cases	Percentage
1	Right (R)	32	53.3%
2	Left (L)	23	38.3%
3	Bilateral (B/l)	05	8.33%
Total		60	

Table 4. Sidewise distribution of Cystic swellings

Sidewise distribution of the swelling showed a higher incidence on the right side of the scrotum 53%, when compared with the left side of the scrotum 38%; Bilateral swelling were present in 8% of the cases.

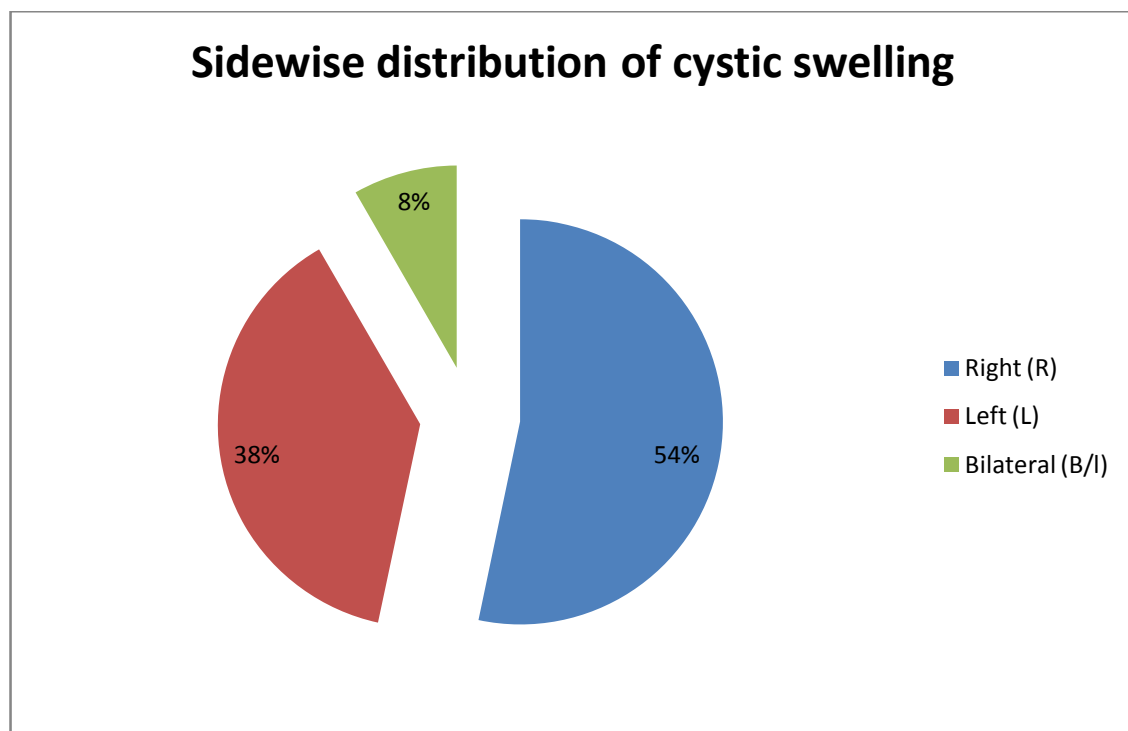


Chart No.4 (Sidewise distribution of cystic swelling)

The type of lesions in the present study

Sl.No.	Lesson	No.of cases	Percentage
1	Primary Vaginal Hydrocele	42	70
2	Congenital hydrocele	4	6.66
3	Epididymal cyst	2	3.33
4	Encysted hydrocele of Cord	2	3.33
5	Secondary hydrocele	6	10
6	Hematocele	2	3.33
7	Pyocele	2	3.33
8	Spermatocele	0	0

Table No. 5. (Type of lesions)

In our study of cystic swelling of scrotum, the commonest presentation was Primary Vaginal hydrocele (70%), followed by secondary hydrocele (10%) and congenital Hydrocele 6% and least was Epididymal cyst – 3.3%.

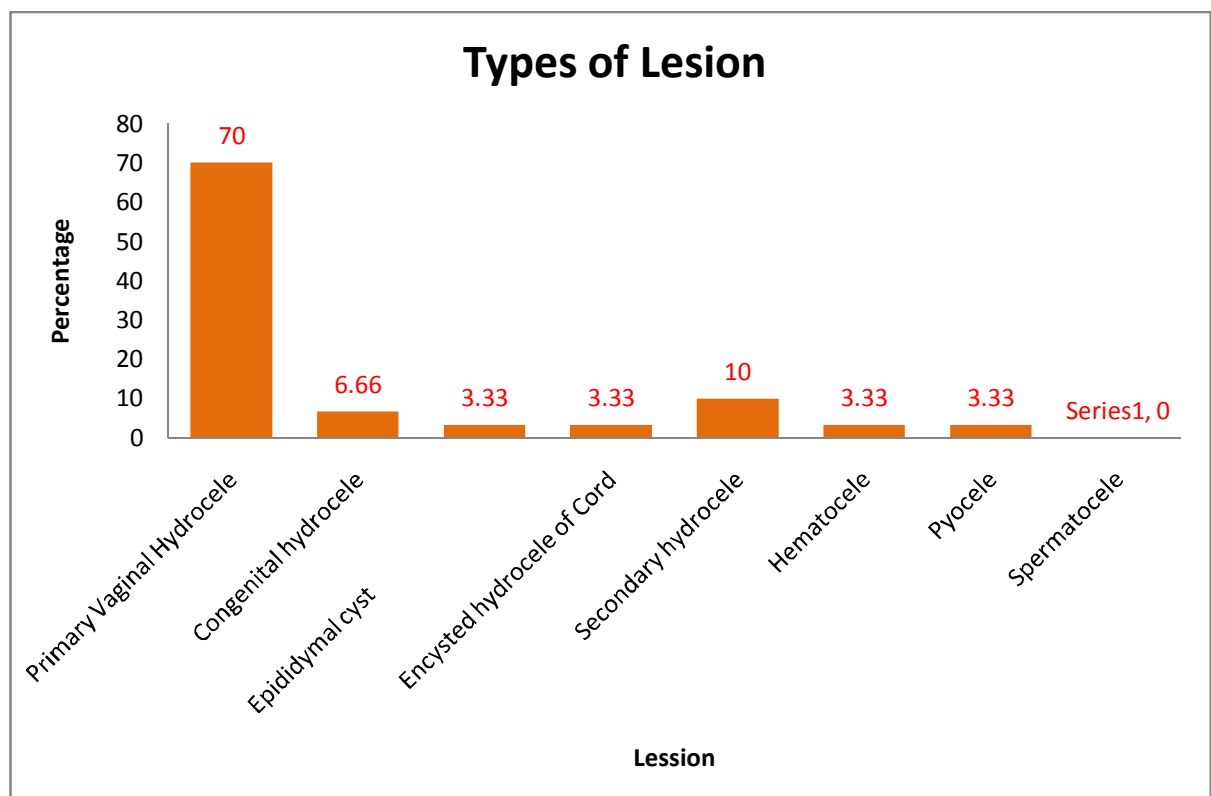


Chart No.5 (Types of Lesion)

Type of Anaesthesia used in the Present study

Sl. No.	Anaesthesia	No. of Cases	Percentage
1	Spinal	60	100%
2	General	0	
3	Local	0	

Table No 6. Type of Anaesthesia

100% of patients were given spinal anaesthesia.

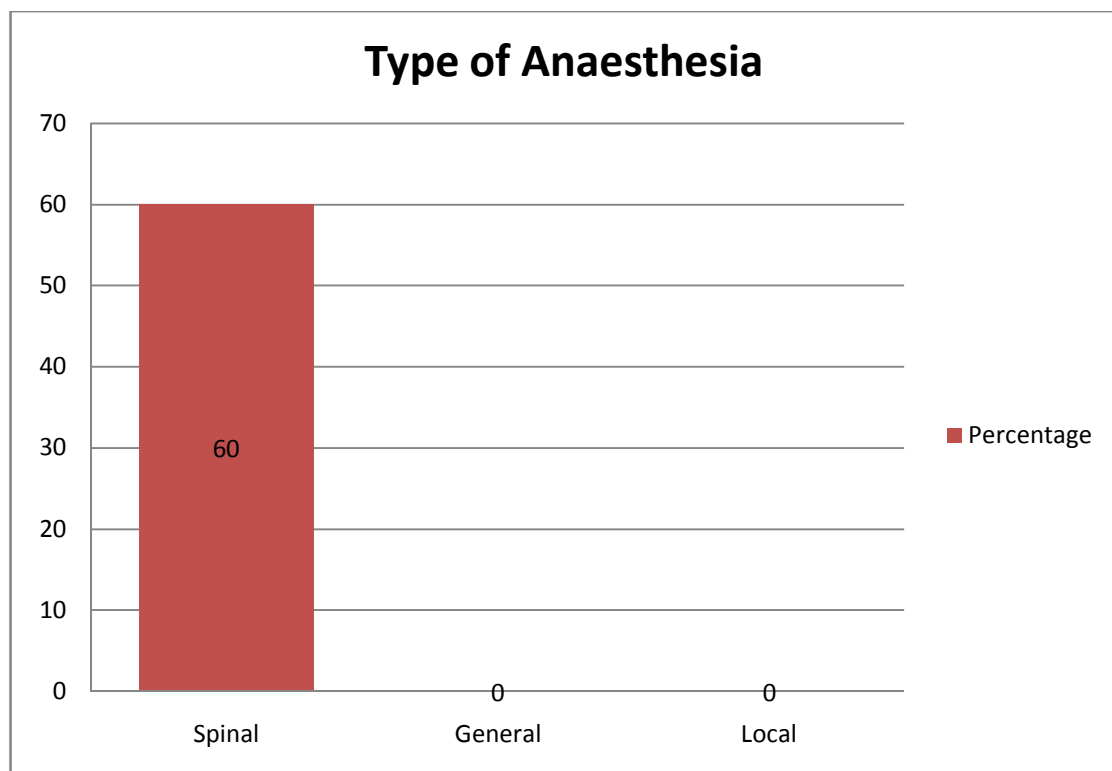


Chart No.6 (Types of Anaesthesia)

TREATMENT

Type of operations performed on the studied cases

Sl. No.	Type of operations performed	No. of Cases	Percentage
1	Jaboulay's eversion of sac	26	43.3%
2	Subtotal excision and eversion of sac	09	1.5%
3	Partial excision and eversion of sac	09	1.5%
4	Lord's Plication	02	3.33%
5	Excision for epididymal cyst and encysted Hydrocele of cord + spermatocele	04	6.66
6	Herniotomy	04	6.66
7	Evacuation of clot and eversion of sac	04	3.33
8	Subtotal excision in secondary hydrocele	04	6.66
Total		60	

Table 7. Type of operations performed

Jaboulay's eversion of sac was done for primary vaginal hydrocele which accounts for 47%. Lord's Plication operation was done for 3% of the cases; Partial/subtotal excision and eversion of sac was done for bigger Hydroceles which accounts for 15% of the cases; Excision of epididymal cyst and encysted Hydrocele of the cord accounts for 6.6% of the cases; herniotomy was done in 6% of the cases; Evacuation of clot and eversion of sac in 3% of the cases.

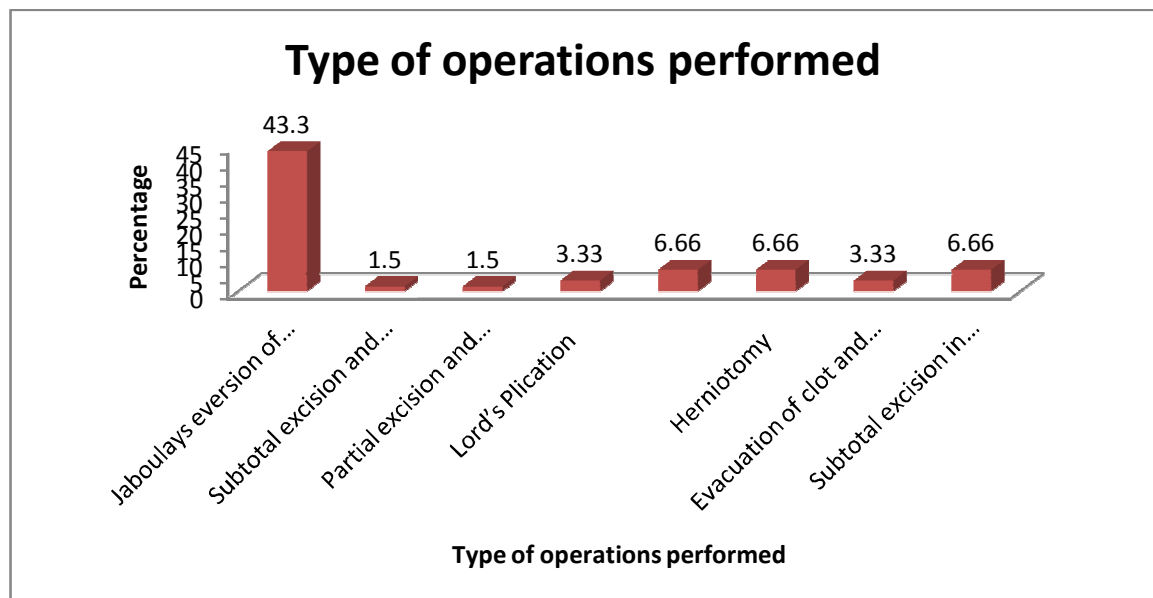


Chart No.7 (Types of operations performed)

Surgical procedure Employed for primary Vaginal hydrocele

Sl. No.	Procedure	No. of Cases	Percentage
1	Lords Plication	59	11.9%
2	Jaboulay's Eversion of sac	18	42.8%
3	Partial excision and eversion of sac	13	30.9%
4	Subtotal excision and eversion of sac	6	14.2%
Total		42	

Table 8. Types of surgical procedure employed

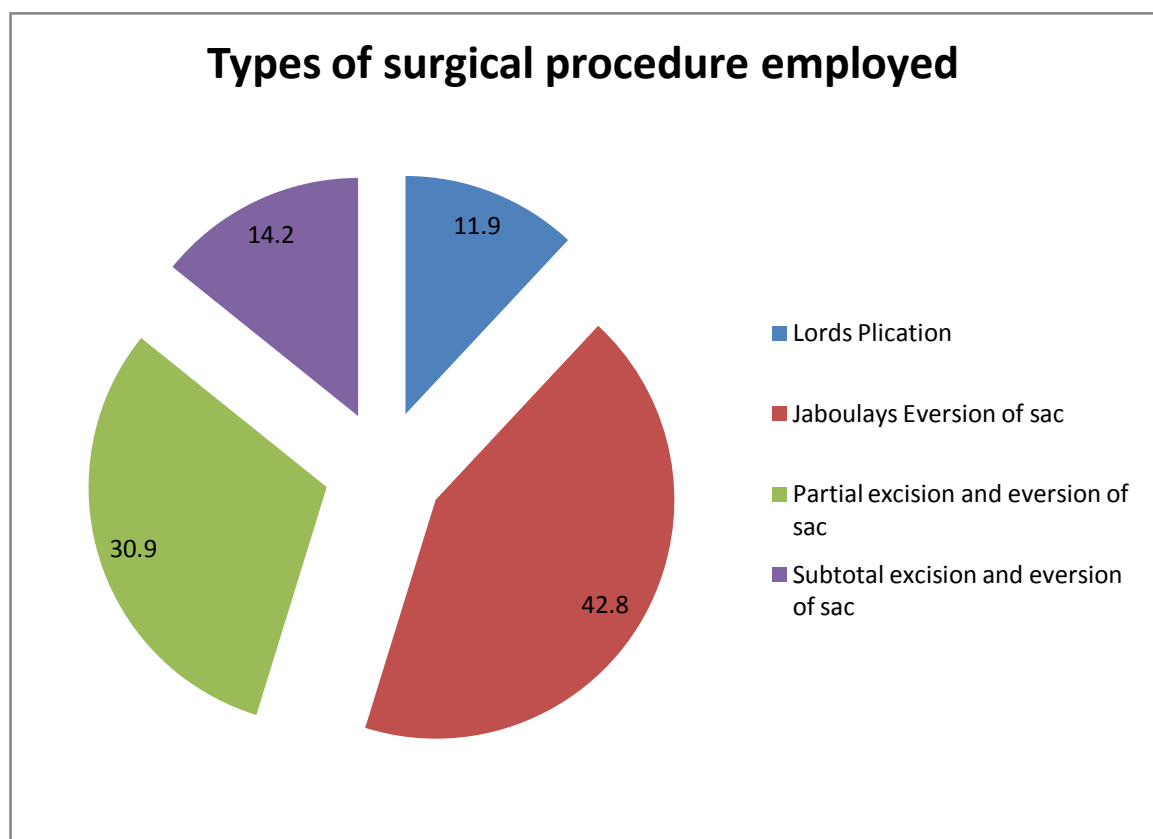


Chart No.8 (Types of surgical procedures employed)

POST OPERATIVE COMPLICATIONS

Post operative complications noticed in the present study

Sl. No.	Operation	No. of Cases	Scrotal Edema	Hematoma	Wound infectio
1	Jaboulay's eversion	26	05	6	3
2	Subtotal excision and eversion of sac	09	2	2	2
3	Partial excision and eversion of sac	09	2	1	2
4	Lord's Plication	02	-	-	-
5	Excision for epididymal cyst and encysted Hydrocele of cord	04	01	1	2
6	Herniotomy	04	2	-	-
7	Evacuation of clot and eversion of sac	02	-	-	-
8	Subtotal excision in secondary hydrocele	04	2	-	-
	Total	60	10	10	9

Table 9. Post operative complications

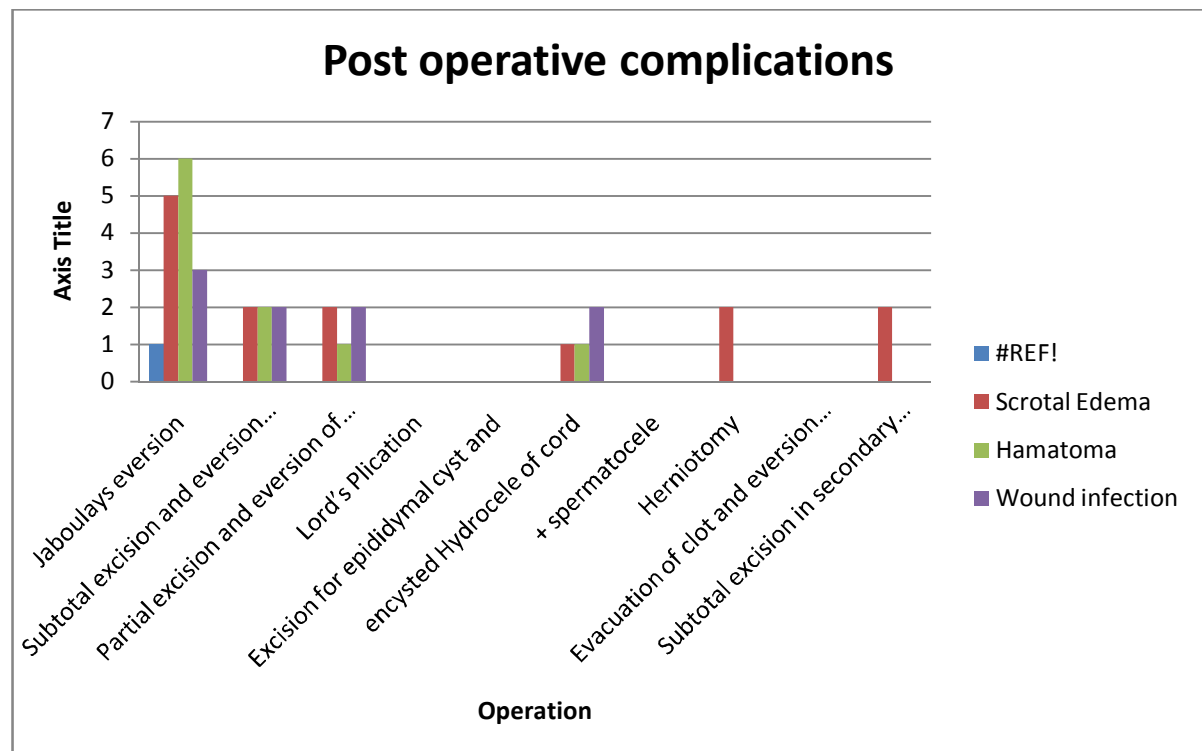


Chart No.9 (Post operative complications)

Pain :-

Post operatively pain was noticed in almost all cases; In Lords Plication, it was comparatively less.

Scrotal Edema :-

Scrotal edema was observed in 10% of the cases. Occurrence of scrotal edema was least following Lord's Plication when compared to other conventional techniques for treatment.

Haematoma :-

Haematoma was observed in 10% of the cases. It was seen following partial / subtotal excision and eversion of sac. No haematoma was observed in Lord's Plication and herniotomies. All the haematomas were managed conservatively with antibiotics, analgesics and scrotal support.

Per operative findings of Testis

Sl. No.	Findings	No. of Cases	Percentage
1	Normal testis	54	90%
2	Flattening of testis	5	8.33%
3	Inflamed testis	1	1.66%
Total		60	

Table 10. Per operative findings of testis

Per-operatively, normal testis was observed in 90% cases; of 5 cases showed flattening of testis in Primary vaginal hydrocele. Inflamed testis was seen in 1%.

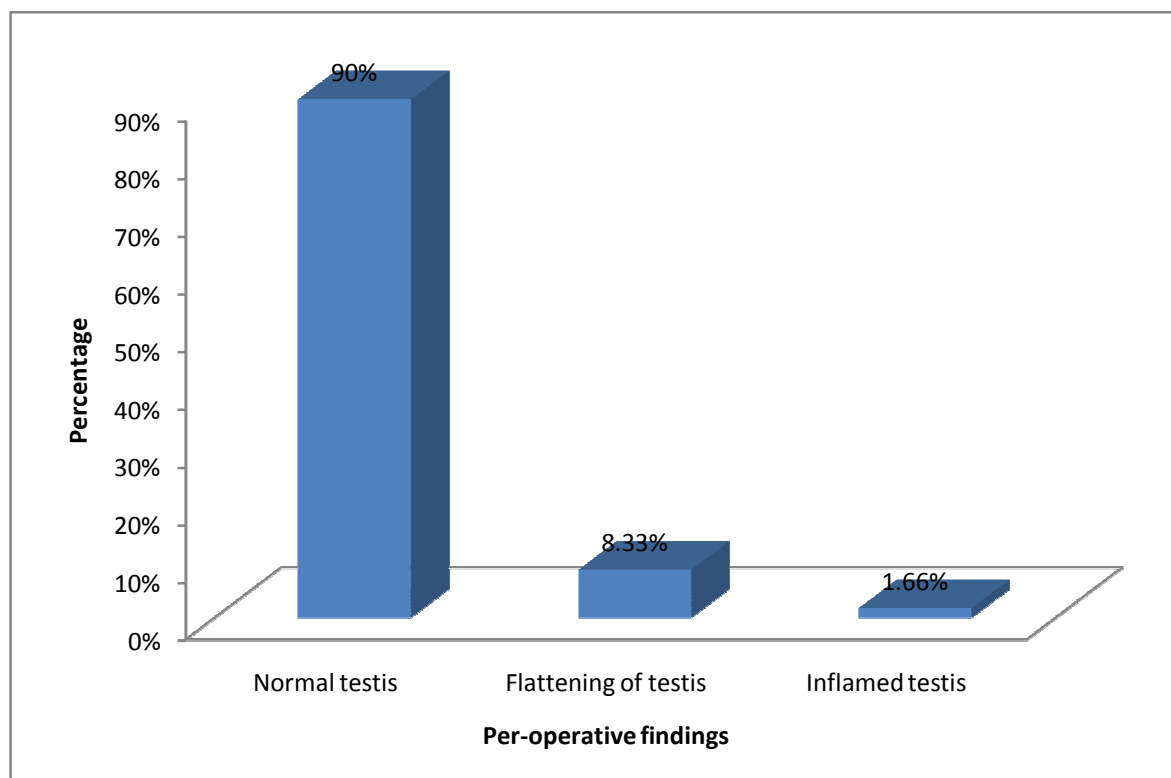


Chart No.10 (Per-operative findings)

DISCUSSION

Study of 60 cases of cystic swelling of scrotum was done between April 2014 to April 2016 over a span of 48 months in Tirunelveli Medical College, Tamilnadu. The study was compared with available literature and other studies.

Cystic swellings of the scrotum occur in all the age groups, but in present study of 60 cases most of the patient were in the 21-30 years age group (19%), followed by 31-40 years of age group (28%), most of them presented with scrotal swelling with pain.

Clinical examination was found to be very important for diagnosis. Most of the swelling were oval in shape or globular. In most cases scrotal rugosity was lost in hydroceles. Majority of the swelling were cystic in consistency, fluctuant, and translucent and transillumination was negative in cases of secondary hydrocele, spermatocele, haematocele, Pyocele and because of the opaque nature of their contents. After scrotal examination; the diagnosis was confirmed by scrotal ultrasonography.

The commonest cause for cystic swelling for the scrotum was primary vaginal hydrocele which accounts for 70%, the other causes were congenital hydrocele 6%, Encysted hydrocele of cord 3%, Secondary hydrocele 10%, Heamatocele 3%, Pyocele 3%. Maximum number of cystic swelling of scrotum were seen in the age group of 21-30.

The Incidence of hydrocele was more common on the right side of the scrotum, when compared to the left side. A similar incidence was observed in a study done by C.Mahalingam (1985)

While no cause could be detected for primary vaginal hydrocele and epididymal cyst secondary hydrocele was due to disease of the testis and epididymis. The cause for Haematocele was recent trauma and for pyocele was infection of hydrocele.

Surgery was gold standard and was employed in all the cases. Spinal Anaesthesia was used in all of the cases ie., No general anaesthesia/ Local anaesthesia used in our surgery.

In primary vaginal hydrocele, Lords Plication was found to be simple, effective and associated with least post operative complications and it can be done as a daycare surgery, the other conventional techniques like Partial/sub-total excision and eversion of sac and in eversion of sac were associated with increased incidence of complications like haematoma, scrotal oedema and infection.

The results of Present Study are comparable to that of the previous series.

Comparison of the present study with the Agarwal series

Table 11. Comparison with the previous series 1

Sl.NO.	Series	Lords plication procedure			Excision/Eversion of sac		
		No.of cases	Haematoma	Infection	No.of cases	Haematoma	Infection
1	Agarwal Series	50	-	-	50	14(28%)	8(16%)
2.	Present Study	2	-	-	18	3(16.6%)	4(22.2%)

Table 12. Comparative studies (Agarwal series) 2

Sl.NO.	Series	Lords plication procedure			Excision/Eversion of sac		
		No.of cases	Haematoma	Infection	No.of cases	Haematoma	Infection
1	Effron et.al	1967	SGO	29	1	30	9(30%)
2.	Dah et.al	1972	Arch Surgery	25	1	23	6(26%)
3.	Reddy et.al	1972	IJS	50	-	20	15(75%)
4.	Rai et.al	1978	RJS	22	-	-	-
5.	Lords	1964	BJS	22	-	-	-
6.	Campbell	1927	SGO	-	-	502	12(24%)
7.	Present Series	2014-15	-	2	-	18	3(10.00%)

The results of this study are comparable to that of Previous series. Of the two cases of hydrocele treated by Lords Plication, none developed haematoma. Hematoma was observed in 3 cases out of 18 cases treated by Partial/ subtotal excision and eversion / eversion of sac. This is high compared to Campbell series, low compared to Rai et al series but comparable to Effron et al and Dahl et al series. Lords plication gave rise to less complications and post-operative morbidity. May be because lords plication procedure avoids the opening of the cleavage between the sac and surrounding tissue, thus reducing the oozing and subsequent hematoma formation. O.P.Agarwal in 1983 did a comparative study on radical cure of hydrocele.

In this study he showed that among 50 cases who were operated by lords plication none of them developed haematoma or infection, where as in 50 cases who underwent, eversion of sac 14(28%) cases developed haematoma and 8 (16%) cases developed infection. In our study, among 48 cases underwent eversion of sac only 15 (31.6%) developed haematoma and 9 (18.7%) cases developed infection.

This study shows that Lords Plication for hydrocele is simple, effective, safe and economical. It is the procedure of choice for management of small to moderate sized primary hydrocele. The only factor against to this procedure is a large hydrocele or a thick walled hydrocele, where eversion, subtotal excision of sac is the operation of choice. Per operatively flattening of testes was noticed in 5 cases of unilateral primary vaginal hydrocele out of 42 cases.

The results of this study were compared with the study done by Dandapat et al.

Table 13. Comparison with Dandapat study

Sl.No.	Series	No.of cases	Effect of pressure on the testis		
			No effect	Flattening of test	Atrophy of testis
1	Dandapat et al ⁴⁸	120	70%	22%	8%
2.	Present Study	42	37 (88.09%)	5 (11.90%)	Nil

In the study done by dandapat et al, on 120 cases of big unilateral hydrocele; there was no pressure effect from the hydrocele on the structure of the testis in 70%, flattening of testis in 22% and atrophy – of testis in 8% of cases.

In present study of 60 cases; there was no pressure effect in (88%). Flattening of testis in (11.9%) of cases and no atrophy of testis in any of the cases.

Epididymal cysts and encysted hydrocele of the cord were treated with excision of cyst. Haematocele were treated by evacuation of clot and eversion of sac.

All the patients were given tight scrotal support and appropriate and analgesics. Corrugated drain was removed after 72 hours. For scrotal wall and scrotal skin chronic catgut 2-0 and ethilon 2-0 was used in all cases.

The common post operative complications observed were pain, scrotal oedema and haematoma, managed conservatively by analgesics scrotal support and antibiotics.

Minimal tissue dissection and with maintain haemostasis during surgery are important for prevention of post operative complications. Post operative scrotal support helps to relieve pain, minimize scrotal odema and prevent haematoma.

Discharge and follow up :-

While discharging each patient was educated about the disease, and the study; and was requested to attend the out patient department for follow up.

Follow up was done for 2-4 months. In general it was poor; may be due to their work at fields or for daily earnings. Cases which were followed regularly showed no recurrence.

Most of our patients were discharged between 5-7 days, but some patients who developed scrotal edema, and infection were kept till 10 days.

The result of present study are comparable to that of the previous series.

Table 14. Comparison of results of various studies

Sl. No.	Author	Year	No. of cases	Post operative stay
1	Efforn et al	1967	29	5
2	Reddy et al	1973	400	5-6
3	Rai et al	1978	50	3-8
4	Present study	2014-2016	60	5-7

SUMMARY

Cystic swellings of the scrotum are a common surgical problem. Patient with cystic swellings of scrotum admitted under the department of surgery Tirunelveli Medical College Tamilnadu , were taken up for study to determine the aetiology, clinical presentation and management of cystic swellings of the scrotum.

Maximum number of cases were seen in 21-30 years of life. The main and only complaint in most of the cases was swelling of the scrotum.

The causes included-Primary Vaginal hydrocele 70% the commonest cause, followed by secondary hydrocele 10%, Encysted hydrocele of the cord 3%, Congenital hydrocele 6%, Pyocele 3%, Hematocele 3%.

Primary hydrocele is idiopathic in origin, epididymal cyst is due to cystic degeneration of the epididymis, while secondary hydrocele was due to underlying disease of the testis and epididymis. Haematocele followed recent trauma and pyocele was secondary to infection of hydrocele.

After scrotal examination, the diagnosis was confirmed by scrotal ultrasonography in relevant cases.

Routine investigations were done for all cases

Surgical treatment was carried out in all 60 cases; 100% under spinal anaesthesia.

All the cases were given tight scrotal support and appropriate antibiotics and analgesics, corrugated drain was placed in some cases and removed after 72 hours. For primary vaginal hydrocele three techniques were employed Lords Plication, Eversion of the sac and subtotal / partial excision and eversion of sac.

Lords Plication had least post operative complications. 5 cases of unilateral primary vaginal hydrocele showed flattening of the testis preoperatively. Excision was done for epididymal cyst and encysted hydrocele of the cord. Haematocele was treated by evacuation and eversion of the sac.

The common post-operative complications were pain, scrotal oedema and haematoma. They were managed conservatively with analgesics, scrotal support and antibiotics.

Patients were then followed up for 2-4 months, there was no recurrence of lesion in the patients followed up during this period.

CONCLUSION

1. Majority of the patients with cystic swelling of the scrotum belonged to the 21-30 years of age group 31% followed by 31-40 years of age group 28%.
2. Primary Vaginal hydrocele is the commonest cause of cystic swelling of the scrotum with 70%.
3. The most common presenting feature is asymptomatic swelling of the scrotum.
4. The exact cause of primary vaginal hydrocele is not known. Secondary hydrocele is due to some underlying disease of the testis and epididymis.
5. Big Primary Vaginal hydrocele of long duration can produce pressure effects on the testis.
6. Surgical treatment is the gold standard for management of cystic swelling of the scrotum.
7. Lord's Plication for hydrocele is simple, effective, safe and economical for small hydrocele
8. Proper preoperative preparation of scrotum and surrounding area; and with good personal hygiene. Most of the post operative infections could be controlled.
9. Minimal tissue handling and with good haemostatic control are the key to prevention of post operative complications.
10. Maximum number of cases were coolie in occupation, followed by Agriculturists and students respectively. Most of them were from poor-socio-economic class.
11. Cystic swelling scrotum was most common on right side of scrotum.
12. Most of the patient were operated under spinal anaesthesia 100%.
13. Haematomas were very common in postoperative period; ie., after subtotal/partial excision of sac in hydrocele, no haematoma in Lords procedure.
14. Follow up was generally poor in this study, most of them followed up till 2 months only few followed up till 4 months, no recurrence was observed in these cases.

BIBLIOGRAPHY

1. Christopher Fowler, "The testis and scrotum", Chapter No. 68 In : Bailey and Love's Short practice of surgery, Ed. Russel R.C.G. et al., 23rd Edition, London : Arnold Publishers, 2000; 1270-1280.
2. Marc Goldstin, "Surgical Management of male infertility and other scrotal disorders". Edited by Patrick C. Walsh, Alan B. Retik, Vaughan E.D., Alan J. Wein, Campbell's Urology. W.B. Saunders Company, 7th EDN, 1998; Vol. 2: 1332-1374.
3. Johstone J.M.S, Hargreave T.B, "Male Urethra and Genital organs", Edited by R.F. Rintoul. Farquharson's Text Book of Operative Surgery, Churchill Living stone 8th Edn. 1995; 672-683.
4. Lavelle M.A, 1996, "Surgical treatment of cystic swellings of the scrotum under local Anaesthesia". Annals of Royal College of Surgeons England. 78:541-543.
5. Courtney S.P., Wightman J.A/K, 1991, "Sclerotherapy for Scrotal Cysts using Tetracycline Instillation". Journal of Royal College of Surgeons Edinburg. 36: 103-104.
6. Rodriguez W.C., Rodriguez D.D., Fortuno R.F, 1961, "The operative treatment of hydrocele - A comparison pfr' 4 Basic Techniques", Journal of Urology. 125: 804-805.
7. Lord P.H, 1964, "A bloodless operation for the Radical Cure of Idiopathic hydrocele", British Journal of Surgery. 51: 914-916.
8. John L Weinerth, Gary N Robertson, "The male genital system", Edited by David C. Sabiston, H. Kirn Lyerly, Sabiston Text Book of Surgery - the Biological Basis of Modern Surgical Practice. W.B. Saunders Company, 15th Edn. 1997; 1556-1562.
9. Tanga et al., 1973, "Abdomino scrotal hydrocele-Shoffhotes of Rare of obscure Cases, British Journal Surgery. 60: 834-836.
10. Andrews E.W., 1907, "The bottle operation method for the radical cure of hydrocele", Annals of Surgery. 46: 915.
11. Solomon A.A., 1955, "The extrusion operation for Hydrocele", N.Y, State Journal of Medicine. 55: 1885.
12. Lord P.H., 1970, "A bloodless operation for spermatocele or cyst of the epididymis", British Journal of Surgery. 57(9): 641-544.

13. Tammala T.L.J. et al., 1992, "Ethanalamine Oleate Sclerotherapy for hydroceles and spermatoceles – A Survey of 158 patients with ultrasound follow up". *Journal of Urology*, 147:1551-1553.
14. Gunaydin G, et al., 1995, "Antibacterial activity of the fluid contents of spermatoceles and epididymal cysts", *British Journal Urology*, 75: 68-70.
15. Fowler CG, "The testis and scrotum". Chapter 79. In: Russel RCG, Williams. S. Norman, Bulstrode J.K. Chiristopher, Bailey & Love 's short practice of Surgery, 24th Ed London, Arnold publications, 2004:1403 -16.
16. Lord H Peter. "A bloodless operation for the radical cure of Idiopathic hydrocele", *British Journal of Surgery*, 1964 Dec, Vol. 51,NO. 12: 914-16.
17. Guyton, Arthur C, "The lymphatic system, interstitial fluid dynamics edema and pulmonary fluid" Chapter 31 in *Textbook of Medical Physiology*, Philadelphia, 1986, 366-7.
18. Walsh C. Patrick, "Abdomino scrotal hydrocele", *Campbell's Urology*, 8th Ed, Philadelphia, Saunders, 2002: 2379.
19. Ozdilek S, The pathogenesis of idiopathic hydrocele and a simple operation technique, *Journal of Urology*, 1957 Feb, Vol. 77, No. 2:282-4.
20. Singh DR, Gupta SK, Gupta Saroj, Lord's procedure - A curative outpatients operation for primary hydrocele, *J.Indian Med. Association* 1996, April, Vol. 94, NO. 4, 141-2.
21. Dedhia CN, Rao SS, Prabhu SR, Role of Filariasis in the etiology of idiopathic hydrocele, *Indian Journal of Surgery*, 1982 March: 161-6.
22. Jubelirer SJ : Metastatic celomic carcinoma to the testis ; *J. Surgical oncology*. 1986 Ma 32 (1): 22-24.
23. Adler BD and et al, Malignant mesothelioma of the tunica vaginalis testis : *Australas Radial* 1992, Feb ; 36 (1) : 29-30.
24. Ahmed M et al : Nonhodgkins lymphoma with primary manifestation in gonads. *JPMA J Pak Med Assoc*, 1994 Apr; 44(4) 86-88.
25. Jamjoom.A et al: Unique complication of CSF shunts in children. *Neurochirurgia (stuttgart)* 1992 Sep 35(5), 156-159.
26. R.Szabo et al ; Hydrocele following internal spermatic vein ligation for varicocele -*Journal of Urology* Nov 1984; 924-926.
27. Dandapat MC, Padhi NC, Patra AP, "Effect of hydrocele on testis and spermatogenesis", *British Journal of Surgery*, 1990 Nov, Vol. 77 1293-4.

28. FitzGibbons JR, Greenburg AG, "Nyhus and Condon's hernia", 5th Ed, Philadelphia, A Lippincott Williams and Wilkins, 2002: 292 & 438.
29. Donald R. Smith, "Physical examination of the genitourinary tract", Ch. 4, General Urology, 9th Ed, California, Lange Medical Publications, 1978: 37-
30. Park John Evert, "Lymphahtic filariasis", Ch. 5 in Parks Textbook of preventive and social medicine, Calcutta, 2000: 199-203.
31. Cotran SR, Kumar Vinay, Collios T, "Male genital system", Ch. 23 in Robbins Pathologic basis of disease, 6th ed, Philadelphia, WB Saunders, 1999: 1014-
32. Johnstone JMS, Hargreave TB, "Male urethra and genital organs", Ch. 28, In: Rintoul RF, Farquharson's textbook of operative surgery, London, Churchill Livingstone, 1995; 678-80.
33. Sadler TW, Urogenital system Ch. 14 in Langman's Medical embryology, 9th Ed, Lippincott Williams & Wilkins, USA, 2004: 357-9.
34. Das Somen, "Testis, Epididymis & Scrotum Ch. 60 in "Concise text book of Surgery", Calcutta, 1996: 1225-32
35. Hamm Bernd, Fobe F, Loy V, Testicular Cysts: Differentiation with ultrasound and clinical findings, Radiology, 1988 July; 19-23.
36. Cho CS et al.: Cystic dysplasia of the testis: Sonographic and pathologic findings, Radiology, 1985: 156, 777-779.
37. Brasilis K.G, Moss DI, "Long term experience with sclerotherapy for treatment of epididymal cyst and hydrocele" NZ Journal of Surgery, 1996 (66): 222-4
38. Daehlin L, Tonder B, Kapstad L, "Comparison of polidoconal and tetracycline in the sclerotherapy of testicular hydrocele and epididymal cyst", British Journal of Surgery, 1997, Sep, 80 (3) 468-71.
39. Sharlip, Ira D, "Surgery of scrotal concerns" Urologic Clinics of North America 1987 Feb: 145-8.
40. Wilkinson J.I, "An operation for large scrotal hydrocele", British Journal of Surgery, 1973, 60:450-2
41. Jhaver PK, Sharma LS, "Surgery of hydrocele", Indian Journal of Surgery, 1979 Dec: 700-4.
42. Agarwal Op, "Radical cure of hydrocele by Lord's method as compared with eversion of sac", Indian Journal of Surgery, 1983. Vol 45: 329-31.
43. Effron G, and Sharkey C.G., 1967, "The Lords operation for hydrocele". Surgery Gynaecology and Obstetrics. 125: 603-606.

44. Dahl et al., 1972, "Lords operation compared with conventional techniques", Archives of Surgery. 104: 40-41.
45. Reddy et al., 1973, "Lords operation for radical cure of hydrocele", Indian Journal of Surgery. 35: 136-138,
46. Rai et al., 1978, "Plication operation for hydrocele", Indian Journal of Surgery, 40: 481-484.
47. Agarwal O.P., et al., 1983, "Radical cure of hydrocele by Lord's method as compared with eversion of sac". Indian Journal of Surgery, 45: 329-331.
48. Dandapat et at., 1990 " Effect of hydrocele on testis and spermatogenesis" , British Journal of Surgery, 77: 11.

PROFORMA

A. Particulars of the patients

Name	I.P.No.
Age	Date of Admission Sex Date of Surgery
Religion	Date of Discharge Occupation
Address	

B) Presenting complaints

1. Swelling

- Duration
- Unilateral Rt / Lt
- Bilateral

2. Mode of onset

3. Trauma Yes / No

4. Fever Yes / No

5. Pain Yes / No

6. Heaviness Yes / No

7. Progress Increasing in size / remaining same / regressing

8. Any difficulty in micturition / walking /sexual act.

9. Any other symptoms

C) Past history

1. Any operative procedure Yes / No

If, Yes, type of operative procedure

2. Suggestive of Tuberculosis Yes / No

3. Urinary tract infection

4. Sexually transmitted disease

i) Gonorrhoea ii) Syphilis

5. Filariasis

D) Family history

1. Married / Unmarried

Male / Female

2. No. of children

E) Personal history

1. Appetite

2. Diet

3. Sleep

4. Bowel habit

5. Bladder habit

6. Habits

Smoking/Alcohol/Tobacco chewing.

F) Treatment history

Yes / No

If yes drug therapy for

1. Tuberculosis

Yes / No

2. Filariasis

Yes / No

3. Sexually transmitted disease

Yes / No

4. Others

G) General Physical examination

1. Appearance

2. Build

Well / Moderate / Poor

3. Nourishment

Well / Moderate / Poor

4. Vitals

- Temperature
- Pulse
- Blood pressure
- Respiratory rate

- | | |
|---------------------------------|--|
| 5. Anaemia | Yes / No |
| 6. Oedema | Unilateral / Bilateral / Pitting / Non Pitting |
| 7. Nails | |
| 8. Cyanosis | |
| 9. Icterus | Yes / No |
| 10. Generalized lymphadenopathy | Yes / No |
| 11. Any other features | |

H) Local examination

1. Inspection

i. Swelling

- | | |
|---|-----------|
| a. Number of swelling | |
| b. Unilateral (Right / Left side or the scrotum) / Bilateral | c. Size |
| d. Shape | |
| e. Surface | f. Extent |

ii. Skin over the swelling

- | | |
|-----------------------------|------------------|
| 1. Rugosity of scrotal skin | Present / Absent |
| 2. Thickening | Present / Absent |
| 3. Odema | Present / Absent |
| 4. Redness | Present / Absent |

5. Median raphe	Present / Absent
6. Ulcer/ Sinus	Present / Absent
7. Punctum	Present / Absent
8. Constriction ring around the middle of swelling	Present / Absent
iii. Position of penis	Present / Absent

iv. Impulses on coughing

2. Palpation

i. Swelling

a. Local temperature	Normal / Elevated
b. Tenderness	Present / Absent
c. Size	
d. Shape	
e. Surface f. Extent	
g. Margins	Rounded/Irregular/Ill defined
h. Consistency	Soft cystic / Firm / Hard
i. Fluctuation	Present / Absent
j. Translucency	Present / Absent
k. Reducibility	Present / Absent
l. Impulse on coughing	Present / Absent
m. Getting above the swelling	
n. Scrotal skin thickness	

ii. Testis

- a. Felt / Not felt / Felt separately from the swelling
- b. Normal / Enlarged
- c. Testicular sensation Present / Absent

Epididymis

- a. Normal / Enlarged

If enlarged - Head / Body / Tail

- b. Size
- c. Shape
- d. Consistency Soft / Cystic / Firm / Hard / Craggy
- e. Fluctuation Present / Absent
- f. Translucency Present / Absent

iv. Spermatic cord

- a. Tenderness Present / Absent
- b. Thickening Present / Absent
- c. Consistency Normal / Otherwise
- d. Traction test in case of cord swelling

- v. Vas deferens** Normal / Thickened / Beaded

vi. Swelling arising from

- a. Testis / Coverings
- b. Epididymis
- c. Spermatic Cord
- d. Skin and subcutaneous tissue

3. Regional lymphnodes

4. Per rectal examination

I) Systemic examination

1. Examination of abdomen
2. Respiratory system
3. Cardiovascular system
4. Central nervous system

J) Provisional diagnosis

K) Management

i. Investigations

1. Blood - Hb%, BT, CT, TC, DC, ESR
2. Urine-Albumin, Sugar, Microscopy
3. Radiological study - Chest X-ray / Screening, Ultrasound scrotum, Ultrasound abdomen
4. Any other investigations

ii. Anaesthesia

1. Local
2. Spinal .
3. General

iii. Operation done and findings

1. Thickness of the sac
2. Hydrocele fluid Quantity, colour
3. Epididymis

4. Fluid from epididymal cyst Quantity, colour

5. Testis

6. Spermatic cord

iv. Drain Used / Not used

v. Post operative course and management

1. Supportive treatment

- Antibiotics
- Analgesics
- Sedation
- Scrotal support

2. Time of drain removal

3. Time of suture removal

4. Complications

- Pain
- Fever
- Skin oedema
- Haematoma
- Infection
- Disruption of wound
- Time of complete healing
- Secondary suturing if any

vi. Fluid analysis

vii. Histopathology report if any

Follow up

KEY TO MASTER CHART

P	Pain	HA	Haematoma
PO	Post operative stay duration	Ex	Excision
PU	Purulent	Ev	Eversion
PVH	Primary vaginal hydrocele	LP	Lord's Procedure
Py	Pyocele	Hr	Hernistomy
PO	Possible	B	Business
Pr	Present	JP	Jaboulay's procedure
R	Right	BL	Blood
SO	Scrotal edema	EC	Epididymal cyst
SSF	Sero sanguinous fluid	CC	Crystal clear
STE	Subtotal excision	HR	Hernia
S	Spinal	El	Elevated
SS	Scrotal Swelling	Ec	Evacuation of clot
ST	Student	PE	Partial excision of sac
SPE	Spermatocele	Fl	Flattened
SH	Secondary hydrocele	BW	Barley water
EHC	Encysted hydrocele of the cord		
SP	Swelling Present	EV	Eversion of sac
T	Thickened	Inf	Inflamed
Tu	Tumour	TT+ve	Traction test positive
1	Side of the swelling	2	Rugosity of scrotal skin
3	Local temperature	4	Tenderness
5	Consistency	6	Fluctuation
7	Translucency	8	Getting above the swelling
9	Test is separated felt/not	10	Spermatic cord
11	Any other test		

PROFORMA

Particulars of the patients

Particulars

Name	I.P.No.
Age	Date of Admission
Sex	Date of Surgery Religion
Date of Discharge Occupation	
Address	

B) Presenting complaints

1. Swelling

- Duration
- Unilateral
- Rt / Lt
- Bilateral

2. Mode of onset

3. Trauma Yes / No

4. Fever Yes / No

5. Pain Yes / No

6. Heaviness Yes / No

7. Progress Increasing in size / remaining same /
regressing

8. Any difficulty in micturition / walking /sexual act.

9. Any other symptoms

C) Past history

1. Any operative procedure Yes / No

If, Yes, type of operative procedure

2. Suggestive of Tuberculosis Yes / No

3. Urinary tract infection

4. Sexually transmitted disease

i) Gonorrhoea

ii) Syphilis

5. Filariasis

D) Family history

1. Married / Unmarried Male / Female

2. No. of children

E) Personal history

1. Appetite

2. Diet

3. Sleep

4. Bowel habit

5. Bladder habit

6. Habits Smoking/Alcohol/Tobacco chewing.

F) Treatment history Yes / No

If yes drug therapy for

1. Tuberculosis Yes / No

2. Filafiasis Yes / No

3. Sexually transmitted disease Yes / No

4. Others

G) General Physical examination

1. Appearance

2. Build Well / Moderate / Poor

3. Nourishment Well / Moderate / Poor

4. Vitals

- Temperature
- Pulse
- Blood pressure
- Respiratory rate

5. Anaemia Yes / No

6. Oedema Unilateral / Bilateral / Pitting / Non
Pitting

7. Nails

8. Cyanosis

9. Icterus Yes / No

10. Generalized lymphadenopathy Yes / No

11. Any other features

H) Local examination

1. Inspection

i. Swelling

a. Number of swelling

- b. Unilateral (Right / Left side or the scrotum) / Bilateral
- c. Size
- d. Shape
- e. Surface
- f. Extent

ii. Skin over the swelling

- | | |
|--|------------------|
| 1. Rugosity of scrotal skin | Present / Absent |
| 2. Thickening | Present / Absent |
| 3. Odema | Present / Absent |
| 4. Redness | Present / Absent |
| 5. Median raphe | Present / Absent |
| 6. Ulcer/ Sinus | Present / Absent |
| 7. Punctum | Present / Absent |
| 8. Constriction ring around the middle of swelling | Present / Absent |

iii. Position of penis coughing

Present / Absent iv. Impulses on

2. Palpation

i. Swelling

- | | |
|----------------------|-------------------|
| a. Local temperature | Normal / Elevated |
| b. Tenderness | Present / Absent |
| c. Size | |
| d. Shape | |

e. Surface

f. Extent

g. Margins Rounded/Irregular/Ill defined

h. Consistency Soft cystic / Firm / Hard i. Fluctuation

Present / Absent j. Translucency Present / Absent k. Reducibility Present / Absent l.

Impulse on coughing Present / Absent m. Getting above the swelling

n. Scrotal skin thickness

ii. Testis

a. Felt / Not felt / Felt separately from the swelling

b. Normal / Enlarged

c. Testicular sensation Present / Absent

Epididymis

a. Normal / Enlarged

If enlarged - Head / Body / Tail

rd / Craggy

iv. Spermatic cord

a. Tenderness Present / Absent

b. Thickening

Consistency Present / Absent

Normal / Otherwise

d. Traction test in case of cord swelling

v. Vas deferens Normal / Thickened / Beaded

vi. Swelling arising from

- a. Testis / Coverings
- b. Epididymis
- c. Spermatic Cord
- d. Skin and subcutaneous tissue

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I) Systemic examination

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J) Provisional diagnosis

K) Management

i. Investigations

1. Blood - Hb%, BT, CT, TC, DC, ESR
2. Urine-Albumin, Sugar, Microscopy
3. Radiological study - Chest X-ray / Screening, Ultrasound scrotum, Ultrasound abdomen
4. Any other investigations

ii. Anaesthesia

1. Local
2. Spinal .
3. General

iii. Operation done and findings

- | | |
|-------------------------------|------------------|
| 1. Thickness of the sac | |
| 2. Hydrocele fluid | Quantity, colour |
| 3. Epididymis | |
| 4. Fluid from epididymal cyst | Quantity, colour |
| 5. Testis | |
| 6. Spermatic cord | |

iv. Drain	Used / Not used v. Post operative course and management
-----------	--

1. Supportive treatment

- Antibiotics
- Analgesics
- Sedation
- Scrotal support

2. Time of drain removal

3. Time of suture removal

4. Complications

- Pain
- Fever
- Skin oedema
- Haematoma
- Infection
- Disruption of wound
- Time of complete healing
- Secondary suturing if any vi. Fluid analysis

vii. Histopathology report if any

Follow up

MASTER CHART

Sl No	I.P.No.	Name	Age in Yrs	Sex	Occupation	Presenting Complaint	Duration	1. Side	2 Rugosity	3 Temperature	4 Tenderness	5 Consistency	6 Fluctuation	7 Translucency	8 Setting above the swelling	9 Testis felt seperately	10 Spermatic cord	11 Any other test	Diagnosis	Anaesthesia	Surgery	Testis	Epididymis	Colour of the fluid	Drain	Complication	POD	Follow up
1	6002	Karthi	22	M	S	SS	3M	Rt	Ab	N	A	Cy	Pr	+ve	Po	YES	N	-	PVH	SA	HR	N	N	AM	K	-	5	3w
2	6101	Mathan	23	M	S	SS	5M	Rt	Ab	N	A	Cy	Pr	+ve	Po	YES	N	-	PVH	SA	LP	N	N	AM	K	-	5	2w
3	5568	Thangapandi	24	M	S	SS	6M	bl	Ab	N	A	Cy	Pr	+ve	Po	NO	N	-	PVH	SA	HR	N	N	AM	K	-	5	1m
4	5477	Nandha	28	M	S	SS	7M	Rt	P	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	LP	N	N	AM	K	-	5	42
5	5427	Kandasamy	30	M	AG	SS	9M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PY	SA	STE+EV	N	N	AM	K	-	5	3w
6	5218	Ramu	23	M	S	SS	4M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	SH	SA	JP	N	N	AM	K	So	5	2w
7	5180	Balaji	22	M	S	SS	10M	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JP	N	N	AM	K	So	5	1m
8	5079	Elengo	25	M	S	SS	9M	Rt	P	N	A	Cy	Pr	-ve	Po	Yes	N	-	PVH	SA	PE+EV	N	N	AM	K	So	5	2w
9	4608	Prithiviraj	29	M	S	SS	2M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	SH	SA	STE+EV	N	SP+N	AM	K	-	5	1w
10	2651	Ramasamy	30	M	S	SS	8M	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PY	SA	EX	FL	N	AM	K	In	5	1m
11	1174	Pandiyam	29	M	S	SS	3M	Lt	P	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	PE+EV	N	SP+N	AM	K	-	5	3w
12	398	Selvam	22	M	S	SS	9M	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	STE+EV	N	N	AM	K	-	5	2w
13	5001	Jeyaraj	21	M	S	SS	12M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	EC	SA	EX	N	N	AM	K	So	5	4w
14	98744	Francis	28	M	AG	SS	3M	Rt	Ab	N	P	Cy	Pr	+ve	po	Yes	N	-	CH	SA	HR	N	N	AM	K	So	5	3w
15	98082	Esakki	29	M	AG	SS	8M	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	STE+EV	N	N	AM	K	Ho	5	2m
16	91128	Rahuman	30	M	BU	SS	9M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	SH	SA	STE	N	SP+N	AM	K	So	5	1m
17	89626	Murugan	28	M	BU	SS	4M	Rt	Ab	EL	A	Cy	Pr	+ve	Po	Yes	T	-	PVH	SA	JP	Inf	N	AM	K	So	5	2w
18	3365	Joseph	29	M	AG	SS	12M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JP	N	N	AM	K	Ho	5	3w
19	1530	Nellai Narayanak	30	M	AG	SS	11M	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JP	N	N	AM	K	-	5	2m
20	1328	Maharajan	32	M	AG	SS	5M	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	SH	SA	JP	N	N	AM	K	Ho	5	3m
21	98918	Maresh	34	M	AG	SS	7M	Rt	P	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	PE+EV	N	N	RED	K	So	5	2m
22	5848	Thangadurai	35	M	AG	SS	8M	Lt	Ab	N	A	Cy	Pr	-ve	Po	No	N	-	PVH	SA	EC+EV	N	N	AM	K	-	5	2m
23	5524	Harikrishnan	36	M	AG	SS	6M	Rt	Ab	EL	A	Cy	Pr	+ve	Po	No	T	-	CH	SA	HR	N	N	AM	K	-	5	3m
24	1466	Marirajan	38	M	B	SS	9M	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	SH	SA	STE	N	N	AM	K	-	5	3w
25	1145	Esakkimuthu. I	39	M	AG	SS	11M	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JP	N	N	AM	K	So	5	2w
26	6055	Ramarajan	37	M	AG	SS	5M	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	STE+EV	FL	N	AM	K	So	5	1m

27	5438	Esakki raja	38	M	AG	SS	11M	Lt	P	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JB	N	N	AM	K	So	5	3e
Sl No	I.P.No.	Name	Age in Yrs	Sex	Occupation	Presenting Complaint	Duration	1.Side	2 Rugosity	3 Temperature	4 Tenderness	5 Consistency	6 Fluctuation	7 Translucency	8 Setting above the swelling	9 Testis felt separately	10 Spermatic cord	11 Any other test	Diagnosis	Anaesthesia	Surgery	Testis	Epididymis	Colour of the fluid	Drain	Complication	POD	Follow up
28	3499	Kattamuthu	40	M	AG	SS	9M	rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JB	N	N	AM	K	So	5	2w
29	3472	Rajasekar	37	M	AG	SS	3M	Lt	Ab	N	A	Cy	Pr	+ve	Po	No	N	-	PVH	SA	EVE+EV	N	N	AM	K	-	5	1m
30	2835	Srinivasan	36	M	BU	SS	9M	Rt	Ab	N	A	Cy	Pr	-ve	Po	Yes	N	-	PVH	SA	STE+EV	N	N	AM	K	-	5	3w
31	2458	David	40	M	BU	SS	14Y	Lt	P	N	A	Cy	Pr	+ve	Po	Yes	N	-	PY	SA	JB	FL	N	AM	K	In	5	2w
32	2294	Vannamuthu	35	M	BU	SS	8M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	SH	SA	JB	N	N	AM	K	In	5	1m
33	2209	Muthukumar	38	M	CO	SS	21Y	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	PE+EV	N	N	AM	K	-	5	4w
34	310	Vargees	39	M	CO	SS	2M	Rt	Ab	N	A	Cy	Pr	+ve	Po	No	N	-	PVH	SA	JB	N	N	Yello	K	-	5	2w
35	98597	Kumarasamy	40	M	CO	SS	3M	Rt	Ab	N	A	Cy	Pr	-ve	Po	Yes	N	-	SH	SA	SE	N	N	AM	K	-	5	3w
36	91025	Lakshman	36	M	CO	SS	1Y	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PY	SA	PE+EV	N	N	AM	K	Co	5	2w
37	92972	Sankaranarayanan	42	M	CO	SS	7M	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	PE+EV	N	N	AM	K	Ho	5	1m
38	94059	Kumarakuru	44	M	CO	SS	4M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	SE	N	N	AM	K	In	5	2w
39	95774	Arumugam	48	M	CO	SS	8M	Rt	Ab	N	A	Cy	Pr	+ve	Po	No	N	-	SH	SA	JB	N	N	Yello	K	In	5	1w
40	97720	Krishnakumar	49	M	CO	SS	9M	Rt	Ab	N	A	Cy	Pr	-ve	Po	Yes	N	-	PVH	SA	STE+EV	N	N	AM	K	In	5	1m
41	91468	Paulraj	50	M	CO	SS	5M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	PE+EV	N	N	AM	K	Ho	5	2w
42	96444	Ramachandran	47	M	CO	SS	11M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	PE+EJB	N	N	AM	K	Ho	5	1w
43	5478	Madasamy	44	M	CO	SS	8M	Rt	P	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	STE+EV	N	N	AM	K	Ho	5	1m
44	5629	Kuppusay	49	M	CO	SS	2M	Rt	Ab	N	A	Cy	Pr	-ve	Po	No	N	-	PVH	SA	JB	N	N	AM	K	-	5	3w
45	97683	Muthiah	56	M	CO	SS	11M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JB	N	N	AM	K	-	5	2w
46	5496	Karuppiyah	57	M	CO	SS	3M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JB	N	N	AM	K	In	5	4w
47	97861	Rangasamy	53	M	col	SS	1Y	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	EX	N	N	AM	K	-	5	3w
48	24/16252	Paulthiraviam	54	M	col	SS	12M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	EHC	SA	JB	FL	N	AM	K	Ho	5	2w
49	145/16207	Paul thiraviam	55	M	col	SS	2Y	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	STE+EV	N	N	AM	K	-	5	1m
50	1011/14336	Gomathi nainara	58	M	col	SS	10M	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JB	N	N	AM	K	In	5	2w
51	1864/13705	Arumugapandian	54	M	col	SS	12M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JB	N	N	AM	K	-	5	3w
52	59/13384	Amuthavannan	60	M	col	SS	2Y	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	TT+ve	EHC	SA	JB	N	N	AM	K	-	5	2m
53	124/14880	Krishna rathnam	59	M	col	SS	10M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	EX	N	N	AM	K	-	5	3m
54	1272/13033	Velusamy	58	M	Ot	SS	12M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JP	FL	N	AM	K	-	5	3m
55	1223/12964	Rathinam	65	M	CO	SS	2Y	Bl	Ab	El	A	Cy	Pr	-ve	Po	Yes	T	-	PVH	SA	JP	Inf	N	AM	K	-	5	2m
56	75/14831	Velmurugan	68	M	CO	SS	1Y	Bl	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JP	N	N	AM	K	-	5	2m

57	922/12663	Rajaram	70	M	CO	SS	4M	Lt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	TT+ve	EHC	SA	EX	N	N	AM	K	Ho	5	3m
Sl No	I.P.No.	Name	Age in Yrs	Sex	Occupation	Presenting Complaint	Duration	1.Side	2 Rugosity	3 Temperature	4 Tenderness	5 Consistency	6 Fluctuation	7 Translucency	8 Setting above the swelling	9 Testis felt seperately	10 Spermatic cord	11 Any other test	Diagnosis	Anaesthesia	Surgery	Testis	Epididymis	Colour of the fluid	Drain	Complication	POD	Follow up
58	330/12071	Mohammed ali	68	M	OT	SS	1-2Y	Rt	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JP	FL	N	AM	K	In	5	3m
59	1426/11583	Rafiative	69	M	OT	SS	3-4Y	Bl	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JP	N	N	AM	K	Ho	5	3m
60	1063/11220	paramasivan	63	M	OT	SS	2-4Y	Bl	Ab	N	A	Cy	Pr	+ve	Po	Yes	N	-	PVH	SA	JP	N	N	AM	K	-	5	3m